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STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

Bulletin 2

Nursery Inspection:

The Importance of Legislation Against Crop Pests

Trenton, N. J., December, 1916

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CONTENTS

PAGE
INTRODUCTION 53
THE ORIGIN OF PEST LEGISLATION 54
THE ACCOMPLISHMENTS OF PEST LEGISLATION 56
NATURE AND EXTENT OF THE WORK IN NEW JERSEY 58
INSPECTION 59
    Inspection of Stock in Nurseries 59
    Inspection of Imported Stock 60
    Inspection of Stock from Other States 62
DEALERS' CERTIFICATES 62
OTHER INSPECTION WORK 62
THE INSPECTION SERVICE 63

LIST OF ILLUSTRATIONS

PAGE
Fig. 1. Map Showing the Distribution of New Jersey's Nurseries and Dealers 54
Fig. 2. Views in New Jersey Nurseries 55
Fig. 3. A Field of Retinosporas in a New Jersey Nursery 56
Fig. 4. A Roadway Through a New Jersey Nursery 56
Fig. 5. A Nursery View in New Jersey 57
Fig. 6. Silver Linden Trees in a New Jersey Nursery 57
Fig. 7. Trees Heeled in at One of the Nurseries 60
Fig. 8. A Packing Shed Showing Tackle for Heavy Cases 60
Fig. 9. Packing Boxes Ready for the Busy Season 61
Fig. 10. Cases in Which Imported Stock Was Received 61
Fig. 11. Spraying Low Plants in a Nursery 64
Fig. 12. Blank Form of Nurserymen's Certificate 65
Fig. 13. Blank Form of Dealers' Certificate 65

NURSERY INSPECTION:
THE IMPORTANCE OF LEGISLATION AGAINST CROP PESTS

Harry B. Weiss

Chief Inspector, Bureau of Statistics and Inspection, New Jersey State Department of Agriculture

INTRODUCTION

When man began to transport plants from one place to another, he unconsciously carried along their insect enemies and fungous diseases. In fact, even before this and from the earliest time, the distribution of pests has been in progress in a state of nature. However, nature in the form of climatic factors and physical features has kept certain species within certain geographical limits. Other factors being equal, man has been able to overcome mere physical obstacles, and as a result many of our now common insect pests were at one time introduced with plant products.

Sometimes insect pests are carried in merchandise; sometimes their introduction is accidential, as for example, those species which might fly on shipboard; but nursery stock is undoubtedly the greatest source of danger.

Here conditions are especially favorable for the transportation of pests. Their food supply is well taken care of and after the arrival of the stock, it is further looked after and cared for. In fact, the care which is lavished upon the plant is unknowingly lavished upon its enemies. Fully one-half of the principal injurious insects in the United States have been introduced from foreign countries and many of them have flourished exceedingly well in their new home. The San José scale, the codling moth, the elm leaf beetle, the Hessian fly, the cabbage maggot, the pea aphis, the cabbage worm, the asparagus beetle are examples which comprise only a small percentage of the total number of introduced injurious insects, which we have with us at present. The injuries inflicted by these imported pests are enormous and in many instances beyond reasonable calculation.

The gypsy moth, liberated in Massachusetts in 1868, cost the state over one million dollars in appropriations between 1890 and 1899 and is not yet under perfect control. In addition to the destructiveness of introduced insects and diseases to orchards and forests, their establishment and spread in suburban residential districts means a depreciation in property value. The fact that introduced pests do not develop immediately in the sections where infested shipments are received is no indication that such pests have not been introduced and that they will not eventually become established. When in small numbers, they are easily overlooked, but it is only a question of time before they develop headway at different points and by the time the public recognizes them for what they are, considerable damage has taken place. Even the health of the public is in danger by the introduction of insects which might carry disease.

If this process of distribution were allowed to go on unchecked by properly enforced legislation, every injurious insect and fungous disease would be as widely distributed upon the earth as climate would permit. The need of inspection, therefore, is apparent. The inspection service constitutes a barrier to the spread of pests. The foundation of this barrier is sound legislation against insects, and its effectiveness depends on the proper enforcement of the laws.

This has been recognized by practically all of the European powers, which have very stringent plant inspection laws, and absolutely prohibit the entrance of nursery stock from the United States. American fruits are admitted only after a rigid inspection showing freedom from pests.

The insect pests and plant diseases that have entered during the past are probably here for all time, but no reasonable objection can be made to the policy of safeguarding the future interests of the people. The nurserymen, the dealers, the importers and the large fruit and forest interests are all protected by suitable inspection and quarantine legislation.

THE ORIGIN OF PEST LEGISLATION

The San José scale deserves credit for one thing, if nothing else, and that is for bringing the agriculturists and horticulturists of the country to a realization of the necessity of having what

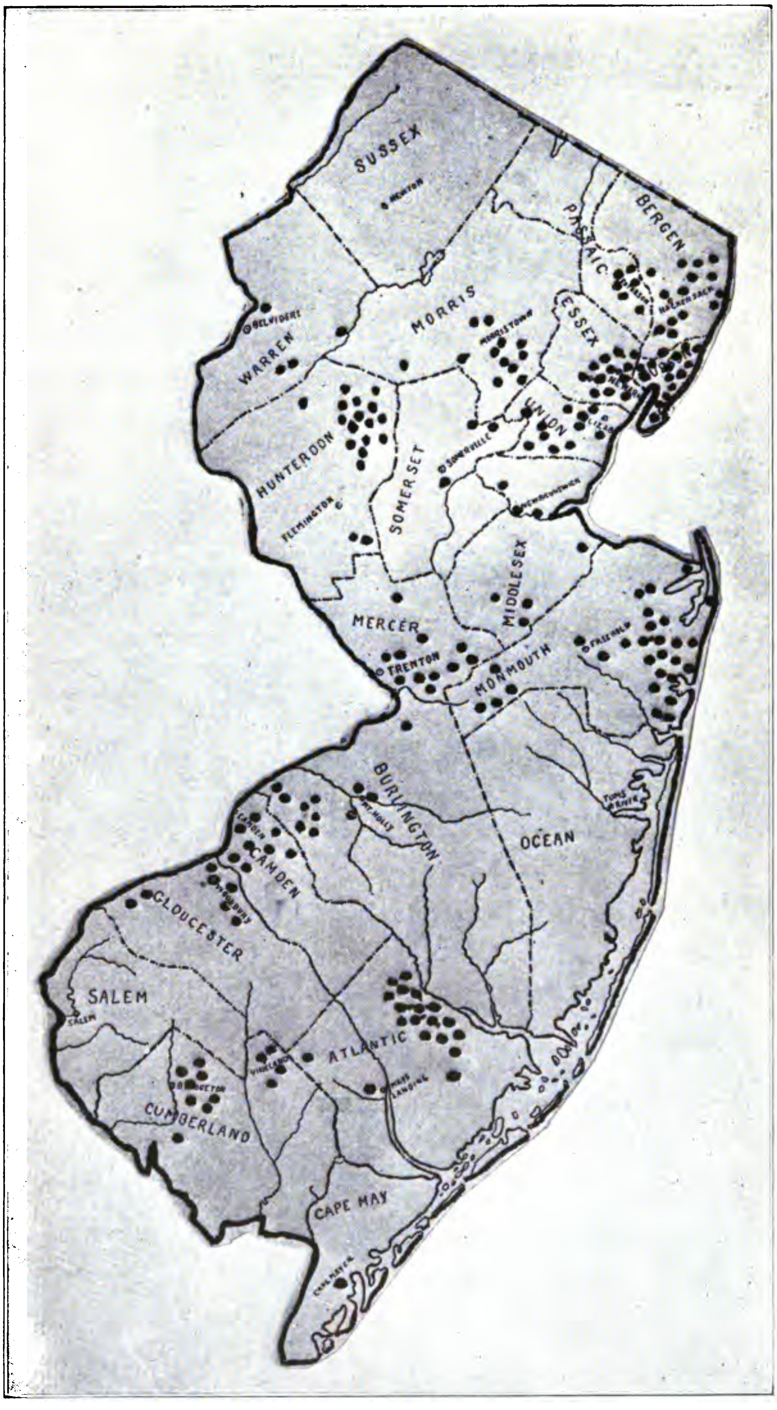


FIG. 1.—MAP SHOWING THE DISTRIBUTION OF NEW JERSEY'S NURSERIES AND DEALERS.

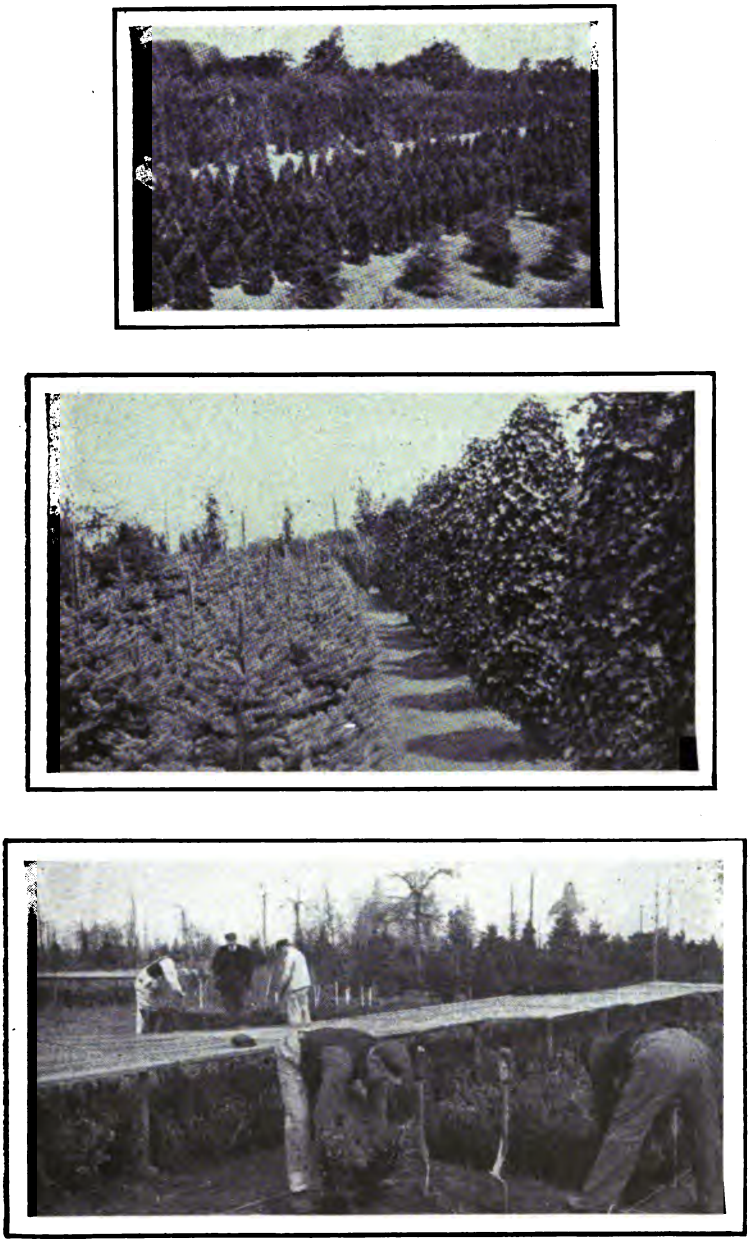


FIG. 2.—VIEWS IN NEW JERSEY NURSERIES.

might be called insect legislation. Pest laws in many states were born out of the fear of fruit growers in the presence of the San José scale.

This insect was first discovered in the East in Virginia during 1893. In 1894, it was found in Maryland. Both of these infestations were traced to a New Jersey nursery firm. A year later it was found in other eastern states and in nearly every case the source of infestation was one or two New Jersey nurseries. Thus New Jersey has the unfortunate honor of being responsible for the spread of the scale along the Atlantic seaboard. It was introduced originally into New Jersey from California on Japanese plums, California having obtained it from north China upon the flowering Chinese peach. In China, by the way, the peach is commonly supposed to have the mysterious power of driving away evil spirits or keeping them at a distance, and in Chinese and Japanese folklore arrows made of peach-tree wood are frequently used for the purpose of piercing the otherwise invulnerable hearts of devils. Unfortunately, its mysterious powers over evil spirits were evidently never effective against the San José scale. Shortly after the seriousness of this pest was forced upon the public, various states passed laws requiring that all nursery stock shipped into such states be provided with a certificate of inspection, and as time went on other states adopted means of protecting their horticultural interests, until at present every state has laws for the purpose of controlling insects and plant diseases within its borders and for the purpose of keeping out undesirable pests. Some state laws are very drastic while others are weak in certain points. Some of them are not enforced because the people do not believe in them, and others are enforced only partly. All of them, however, are the outgrowth of a desire on the part of the people to protect themselves and their interests.

In New Jersey, the law providing for the inspection of nurseries was enacted in 1898. In 1903, more complete legislation was secured, and this, with supplementary laws in 1904 and 1911, constitutes the foundation of our present inspection system. The work in New Jersey was first attended with difficulties. There was a tendency among some nurserymen to avoid the law's requirements and sell, among their neighbors at least, in defiance of it. Gradually, however, they realized that the regulations were for their benefit and were not restrictions, so that at the present time there is perfect harmony between the nurserymen and officials enforcing the law, and a desire and willingness on the part of each to cooperate as fully as possible.

THE ACCOMPLISHMENTS OF PEST LEGISLATION

Various benefits have been derived by the different states under their existing laws. Formerly the entomologist and the plant pathologist devoted their entire attention to the study and control of native species, but now their attention is directed toward exclusion. By inspection systems faithfully carried out the establishment of many species of injurious insects and plant diseases has been prevented. If such work had been started many years ago, its saving to the country at large would have been enormous.

In New Jersey, by reason of the enforcement of such legislation, the purchaser of nursery stock is assured of clean material to start with. The fruit grower who buys hundreds of trees with which to plant an orchard and the commuter who carries a lone fruit tree home for planting in his back yard, are both sure of getting clean stock only by reason of the inspection service, and in many cases both are unaware that their interests have been looked after by the State.

If such a service did not exist, the San José scale would still continue to be distributed everywhere, crown gall would be more prevalent than it is and various other diseases and insects would be purchased by the buyer, along with the stock. It is not meant by this that nurserymen are dishonest and would knowingly sell pest-infested stock, but in many cases the nurserymen themselves are unfamiliar with such pests.

The same protection is given to the purchaser of ornamental stock. The wealthy estate owner, who buys thousands of ornamental trees and shrubs for his private estate and the person who buys a 10-cent rose bush are both beneficiaries under the inspection law, and as before, in many cases both are unaware of its existence.

In addition, the inspection aids the nurseryman by furnishing him with an insect and disease record of his nursery and help in combating pests likely to become injurious. All that the Bureau of Inspection requires is that he sell stock free from insects and plant diseases. This is a perfectly fair and reasonable demand, which in most cases is recognized as such.

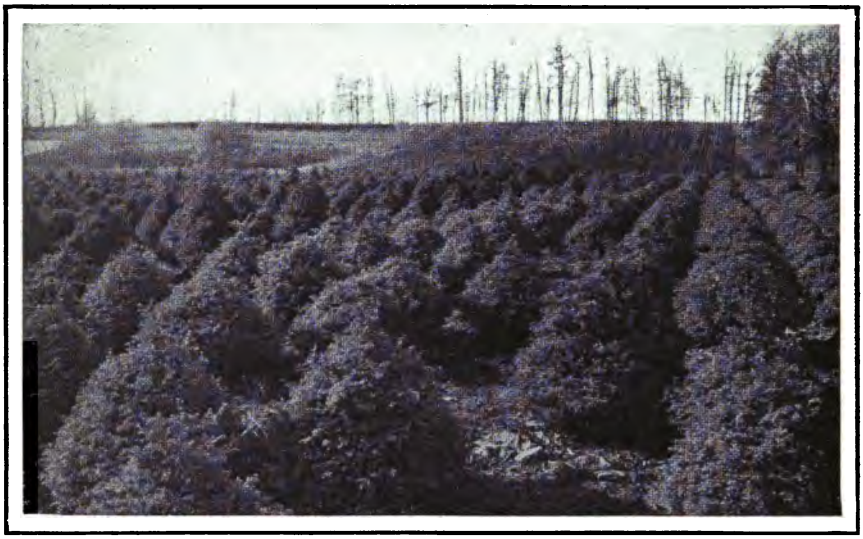


Fig. 3.—A Field of Retinosporas in a New Jersey Nursery.

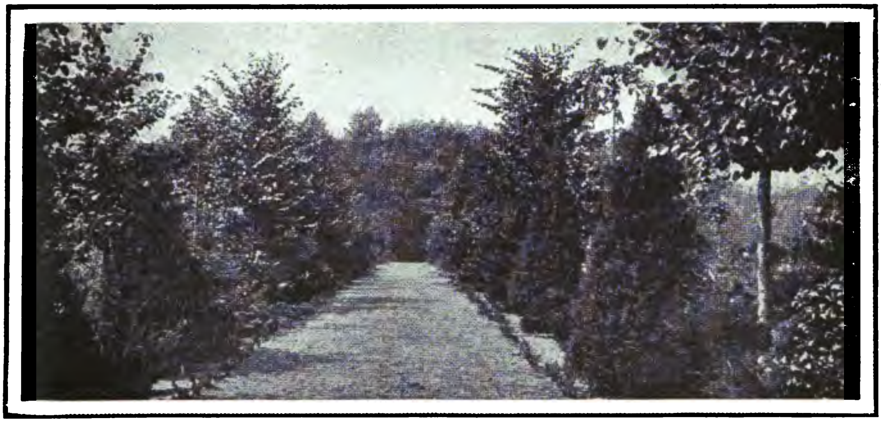


Fig. 4.—A Roadway Through a New Jersey Nursery.

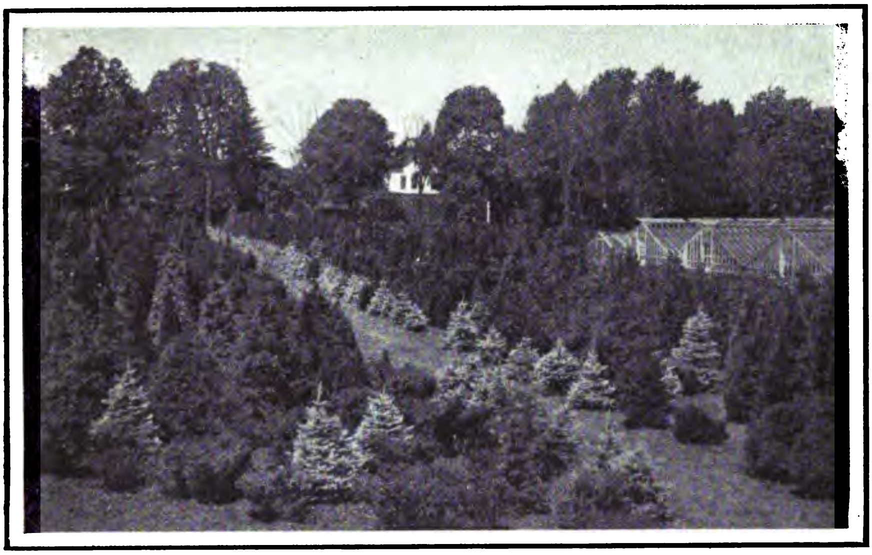


FIG. 5.—A NURSERY VIEW IN NEW JERSEY.

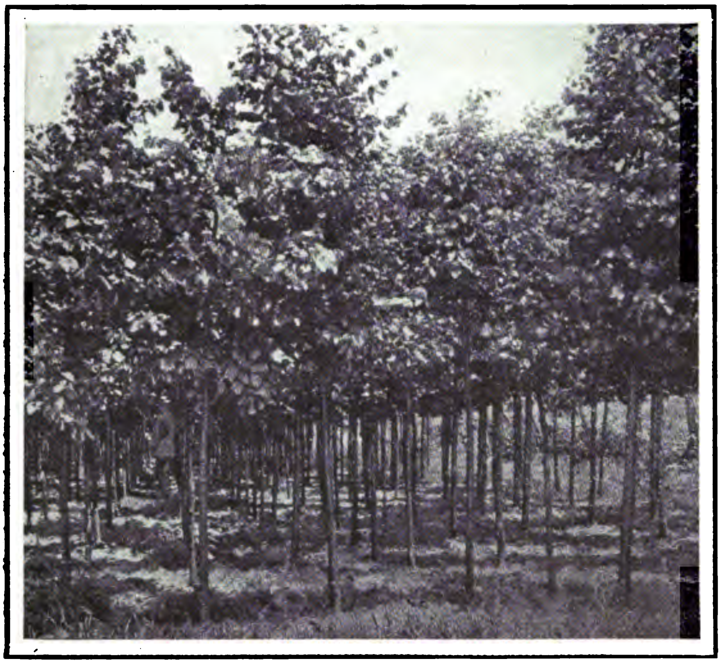


FIG. 6.—SILVER LINDEN TREES IN A NEW JERSEY NURSERY.

Another result of inspection is the prevention of the introduction of various European pests by the inspection of imported stock. Were it not for this the State would be overrun with foreign insects and diseases capable of causing considerable economic loss. If the bureau accomplished nothing else during an entire year except the destruction of a single case of seriously infested stock, the cost of the service would be well worth it, as the amount expended would shrink to a mere trifle compared with the amount which would undoubtedly be expended later in fighting the pest.

The brown-tail and gypsy moths which are present in the New England States have caused the federal and state governments an expenditure of over $7,000,000, and the same governments together with private individuals are spending $1,000,000 yearly in an effort to prevent the increase and spread of these insects. Both have in the past entered New Jersey, but the infestations have been promptly eradicated. In one case, it was necessary to call upon the federal government for help. In the case of the gypsy moth, this pest was found to the extent of 198 egg masses in a nursery block of evergreens. In cooperation with the Bureau of Entomology, U. S. Department of Agriculture, the services of a number of experienced moth scouts were secured, and beginning at the point where the eggs were found, the territory was scouted in every direction for four or five miles. The block of evergreens where the eggs were found was then placed under quarantine and the trees therein sprayed thoroughly three times during the season. As a further precaution, the entire block was fenced in, the fence being eight inches high and coated on the top with tanglefoot. This was to prevent any caterpillars which might have escaped the previous treatments from crawling away and infesting other trees. In addition, the infested block was gone over carefully, tree by tree, for several times before the quarantine was lifted. In this manner, the gypsy moth was eradicated from the State.

Another case is the present finding by the plant pathologist of the white pine blister rust, a serious disease of white pines, in several localities in New Jersey, and steps are now being taken to stamp out this disease and prevent its spread.

The inspection of stock arriving from other states serves to prevent undesirable material from being shipped into New Jersey. Outside shippers are inclined to be careful if they know that their plants will be scrutinized before being accepted, and as a result, trees containing crown gall, San José scale and other pests will not find their way into shipments destined for New Jersey. Therefore, this phase of the service protects the buyer, and as well serves the interests of the State at large.

At different times, serious insect pests have been intercepted and destroyed before getting a foothold in the State, and the same applies to plant diseases. These happenings occur more or less regularly during the inspection season and are taken as a matter of course by the inspector, but at the same time it must be remembered that a considerable service is being rendered to the citizens of the State. It should also be kept in mind that the most careful and thorough inspection in the country is not an absolute guarantee against the introduction of pests. Insects may come in along with the soil or packing, or they may enter unobserved, on account of the laxity of the inspector or his ignorance of foreign pests. The success of the service depends to a certain extent on the personal element, which is never a fixed factor. Again, many plant diseases have a dormant period during which it is impossible to detect them. Fortunately, however, the federal government is becoming more and more strict concerning destructive foreign pests and is establishing quarantines against plants likely to carry them.

NATURE AND EXTENT OF THE WORK IN NEW JERSEY

Before taking up the subject of inspection, it is first necessary to consider the nurseries within the State and their activities. People engaged in the nursery industry in New Jersey show a tendency to specialize, and may be grouped about as follows:

1. *Dealers.* In many cases these are chiefly florists who buy nursery stock from various sources and resell it.

2. *Berry Nurserymen.* These firms are numerous and as a rule small. Most of them handle only small fruits, part of which they grow themslves and part of which they purchase from neighboring farms.

3. *Those growing miscellaneous fruit and other stock.* There are only a few of such nurserymen in New Jersey, and most of them do not ship outside of the State.

4. *Those growing peach trees only.* These are not very numerous, and most of them grow for local distribution only.

5. ***Those growing shade trees and ornamental stock.*** These are greatest in number and are increasing. The demand for shade trees is constantly growing as cities, towns and villages become interested through shade tree commissions. In the smaller towns and city suburbs, hedges and shrubbery are in more or less constant demand. A large percentage of New Jersey's ornamentals go into interstate traffic and, on the whole, the nurseries are in excellent condition.

The actual number of certificates issued yearly is in the neighborhood of 220 of which number 50 go to dealers. The shade tree and ornamental nurseries, which are the greatest in number, are located mainly in the northern half of the State, and this is also true of the peach nurseries. In the southern half are most of the berry nurseries, while the dealers are distributed throughout the entire State.

The total acreage of all the nurseries in the State is about 2,600, of which 200 acres are devoted to fruit and berry stock, the remainder being planted to general ornamental stock. The largest nursery comprises an area of 400 acres, while the smallest has only ¼ of an acre. These nurseries handle during a season over 2,000,000 pieces of stock having a valuation of several millions of dollars.

INSPECTION

This work is easily divided into three kinds: (1) the inspection of the growing stock in the nurseries, (2) the inspection of stock imported into New Jersey from abroad, and (3) the inspection of stock received from other states. Each division of the work can be treated separately.

Inspection of Stock in Nurseries

The purpose of this work is to prevent the distribution of harmful insects and plant diseases which may be present in the nursery. If no such inspection existed, the San José scale, for instance, would still be distributed throughout New Jersey and other states, and the same is true of other injurious insects and plant diseases. The actual work of inspection entails considerable labor and knowledge. It means that plantings of fruit stock must be gone over and examined until the inspector is reasonably sure of their freedom from pests. The same is true of other classes of stock. Different trees are subject to different pests. White pines, for instance, are examined particularly for the blister rust and the European pine shoot moth; boxwood, for the European box leaf miner; berry stock for anthracnose, crown gall and cane blight; and so on through the entire list of plants ordinarily found in a nursery.

At the same time, watch is kept for various pests not yet present in New Jersey, but which exist in other states, so that prompt measures can be taken if they are detected. A list of all pests, important and otherwise, found in each nursery is kept by the Bureau of Inspection and Statistics so that exact information is available on the seriousness and abundance of each insect and disease. The legal basis for this work is found in Chapter 268, Laws of 1916, State of New Jersey, which requires that all nurseries be inspected, it being unlawful for any nurseryman or other person to offer for sale any stock which has not been inspected. After such stock has been inspected and found to be in a satisfactory condition, it is the duty of the Bureau of Inspection and Statistics to issue a certificate stating the comparative freedom of the stock in question from serious insects and diseases. If a serious plant disease or insect is present in the nursery, it is the duty of the owner to get rid of it either by the destruction of the stock, or by spraying, or in such manner as dictated by the bureau.

As a check upon nurseries or persons attempting to dispose of stock which has not been inspected, it is the duty of every railroad, steamship or express company or other carrier for hire within the State to refuse for transportation stock not provided with an official certificate of inspection or a copy.

This work is carried on from July 1 to the middle of October, by which time practically all of the nurseries have received certificates.

Inspection of Imported Stock

This inspection is for the purpose of preventing the introduction and spread of plant diseases and insects not already established in New Jersey. There are still many serious diseases and insects in foreign countries which are not present in the United States, and to prevent their introduction all imported stock must be inspected. On account of the similarity between the climate, animals and plants of North America and the northern parts of Europe and

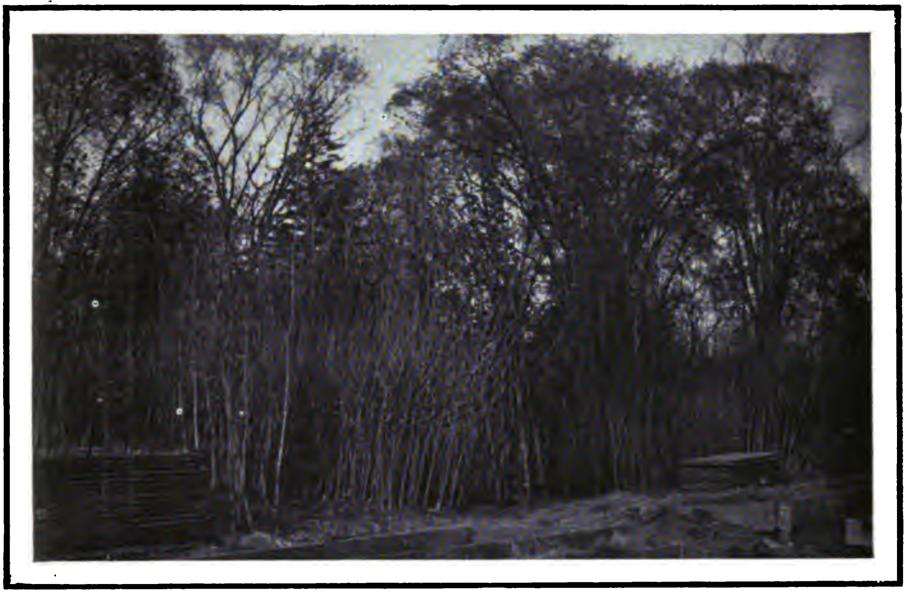


Fig. 7.—Trees Heeled in at One of the Nurseries.

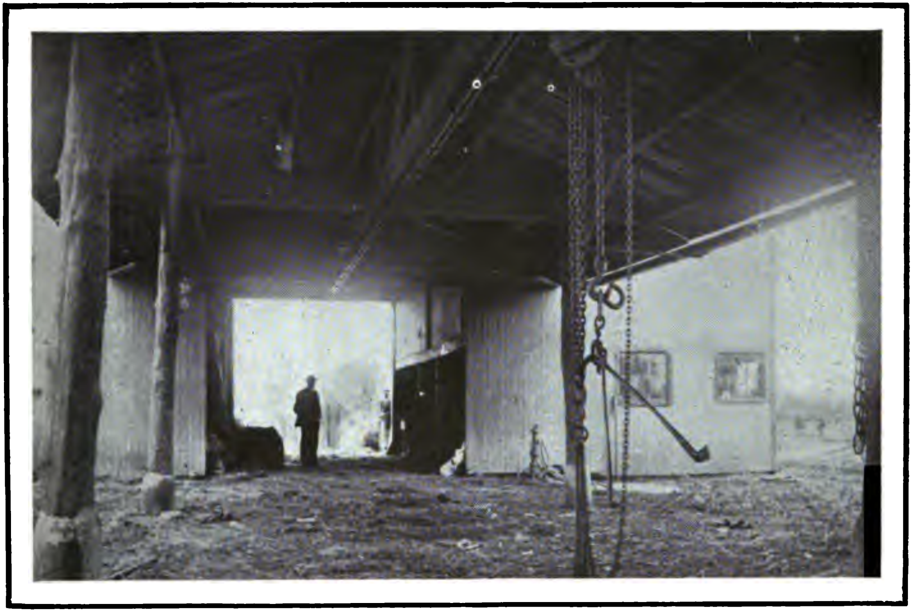


Fig. 8.—A Packing Shed Showing Tackle for Heavy Cases.

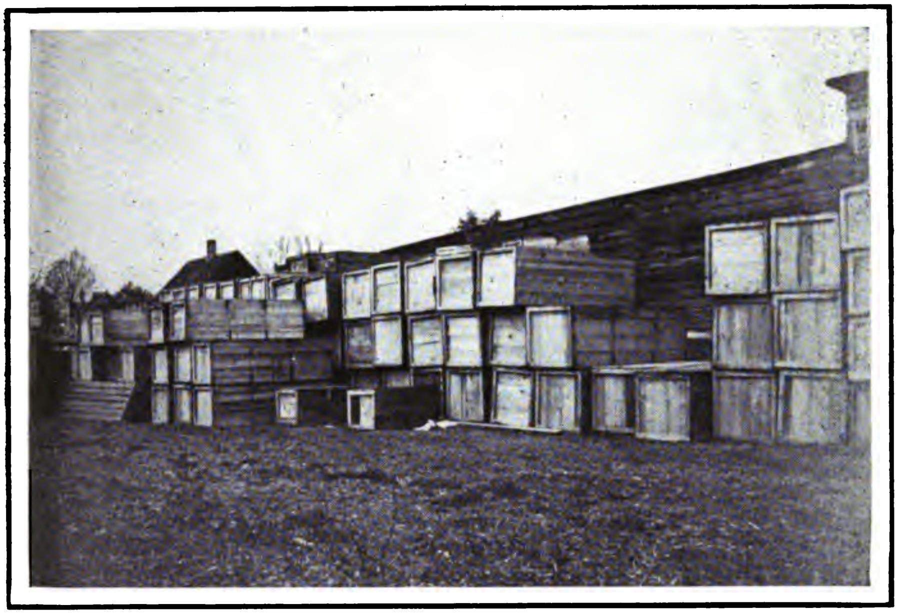


Fig. 9.—Packing Boxes Ready for the Busy Season.

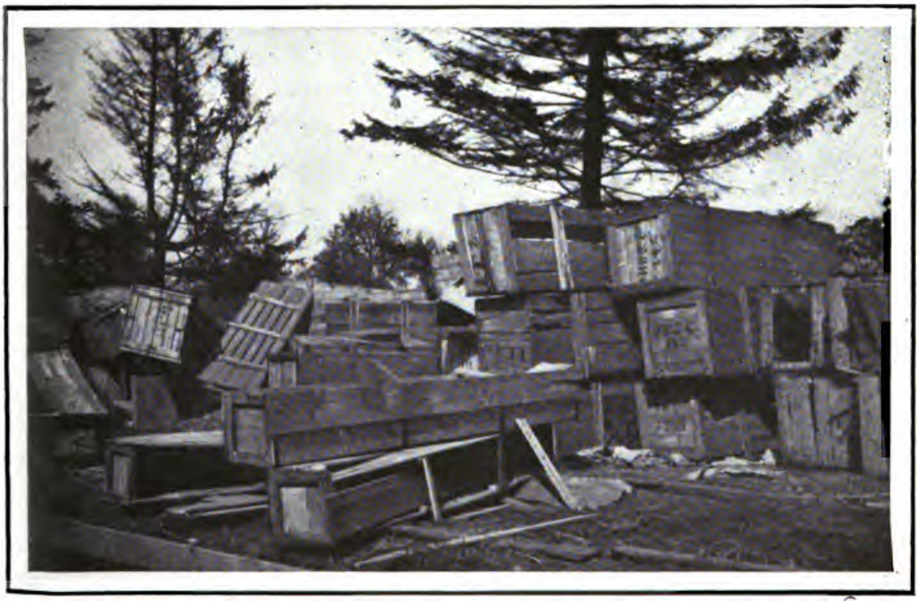


Fig. 10.—Cases in Which Imported Stock Was Received.

Asia, various European pests do very well in this country, especially when allowed to develop unchecked by parasitic enemies and cultural methods. Imported nursery stock is undoubtedly the greatest source of danger and many of our now common insects and plant diseases were introduced before quarantine laws and inspection systems were in force. A pest which is comparatively unimportant in its own country may become a serious menace when placed under new conditions where climate is favorable and natural enemies absent.

New Jersey receives from 10,000 to 12,000 cases of nursery stock from Europe, Asia and South America each year, aggregating millions of individual plants ranging from seedlings to well established plants. Almost one-fifth of all the nursery stock imported into the United States comes to New Jersey. Most of it comes from Holland and Belgium, although France, Germany, Japan, England, Scotland, Italy, Spain, Denmark, Ireland and the various countries of South and Central America also are represented.

From Holland, we receive roses, boxwood, aucubas, shade trees, rhododendrons, fruit trees, shrubs, evergreens, hydrangeas, etc.; from Belgium, azaleas, palms, bay trees, araucarias, rubber plants, aucubas, aspidistra, etc.; from England, Ireland and Scotland, mainly roses; from France, roses, shrubs, fruit stock, lilacs and evergreen seedlings; from Germany, roses, fruit trees and roots; from Japan, azaleas, maples, evergreens, fruit trees, wistaria and roots; from Cuba and Trinidad, dracena canes; from the Canal Zone, Guatemala, United States of Colombia, Brazil and Venezuela, palm seeds and orchids; and from Italy, grape cuttings and fig trees.

This stock is all liable to carry insects and disease no matter how careful its inspection in the country of origin may have been carried out. The legal basis for the New Jersey inspection is found in Chapter 268, Laws of New Jersey, 1916, which gives the bureau the right to detain and inspect all nursery stock shipped into New Jersey from any foreign country, even though such stock is accompanied by a certificate.

At the present time, a notice of every shipment consigned to New Jersey is sent to the chief inspector by the broker and the Federal Horticultural Board. Upon receipt of these notices word is sent to the consignee, requesting him to inform the inspection officer upon the arrival of the stock so that it can be inspected without delay. The inspection of imported stock is carried on chiefly from the middle of October to the middle of May, the bulk of it arriving during November, December, March and April.

Inspection of Stock from Other States

Every fall and spring there are shipped into New Jersey from other states, hundreds of cases of fruit stock, shade trees, evergreens, roses and various other ornamental plants of which the fruit stock especially must be inspected. The purpose of this inspection is to prevent the distribution in New Jersey of such pests as crown gall, blight, anthracnose, San José scale, woolly root lice, and such other plant diseases and insects as the stock is liable to carry.

In the case of ornamental stock, the white pine blister rust is an example of an undesirable disease which should not be admitted into New Jersey, and the same is true of such insects as the brown-tail and gypsy moths. The legal basis for this work can be found in Chapter 268, Laws of New Jersey for 1916, transportation companies, consignees and consignors being required to notify the chief inspector of the arrival of each shipment.

DEALERS' CERTIFICATES

Dealers in nursery stock are required to submit to the Bureau of Statistics and Inspection a list of the firms from which they purchase stock. If this list is satisfactory, a certificate is issued. In many instances the dealers have left-over stock on their premises and this, also, must be inspected and found satisfactory before a certificate is granted.

All department stores, seed stores, etc., handling nursery stock are classed as dealers and the sources of their stock investigated.

OTHER INSPECTION WORK

In addition to the regular inspection work as has been outlined above, it is the duty of the bureau to investigate insect outbreaks and complaints of insect and disease nuisances. This means the special inspection of orchards, shade trees and plants on private estates.

Another phase of the work is the inspection of various plants which private individuals wish to ship within or out of the State. Still another and very important duty of the bureau is the inspection of private estates, plantings, reserves, etc., for special injurious diseases and insects not widely distributed in the State or the United States. In this manner, the presence or absence of serious pests is confirmed. If absent, precautions can be taken to prevent their admittance. If present, steps can be taken to eradicate them and to prevent their spread. In this connection it is only fair to state that in more than one instance the Federal Horticultural Board has placed at our disposal inspectors for this work when our own funds would never have permitted it, and that their findings and help have aided us considerably in locating and preventing the spread of two serious pests, namely the gypsy moth and the blister rust of white pine.

THE INSPECTION SERVICE

Prior to July 1, 1916, the inspection work was carried on by the State entomologist and the State plant pathologist, each acting within his own sphere, and, while these officers cooperated as fully as conditions would permit, it was at times impossible for each to avoid duplicating the other one's work, especially in the matter of assignments which the inspectors were given. There also existed in the minds of many persons an uncertainty as to the proper official to address concerning inspection and this led to unnecessary but unavoidable delays in the proper performance of the work.

On July 1, however, the law enacted by the Legislature during the winter of 1916 establishing a Department of Agriculture became effective, and the inspection work was transferred to a Bureau of Statistics and Inspection operating within the Department. Under this new arrangement, a greater degree of efficiency has been made possible, the inspections formerly made independently under the direction of the State entomologist and State plant pathologist now being carried out by a chief inspector under their supervision and under the direction of the chief of the bureau. In this manner the duplication of the work has been avoided, more work has been accomplished with the same number of men, and the confusion in the mind of the public will gradually disappear as a matter of course.

The creation of a Department of Agriculture has also opened up an avenue for the necessary expansion of the work. In 1910.

112 certificates were issued, in 1914, the number was 168, and at present the number is 220. By next year it will undoubtedly be increased to 250. Thus it is seen that the number of nurseries needing inspection is increasing every year. In addition new insect and plant disease control problems are appearing and must be solved. In many cases these call for additional inspections. Every year more and more stock is being shipped into New Jersey from foreign countries and other states and this too must be properly taken care of. Thus in the immediate future, it will be necessary to plan for the inspection of this material imported into New Jersey to meet the demands of a growing population. More time also will have to be given to the inspection of the growing stock in nurseries and private plantings for the purpose of confirming the presence or absence of pests.

In the past, our appropriations have never been sufficient to permit a full execution of the law, but by a careful distribution of the funds and work, it has been possible to regulate the inspection so that each kind came in for a share. Moreover, as the public which purchases nursery stock regards the New Jersey certificate as a guarantee of the stock's freedom from pests, it is our duty to put forth every effort to make the certificate mean exactly what it states.

Even though inspection is not an absolute "cure all" against the introduction of pests, it is the only means at our command of preventing an overwhelming rush of insects and plant diseases capable of doing considerable damage, and it is the only way we have of holding and delaying the spread of pests until means of controlling them have been found, or until they are no longer dangerous. Even in this restricted use, inspection is a necessary phase of the State's agricultural activities and has done much in the past to lessen her burdens, especially as the presence or absence of insects within the borders of a community or state may make all the difference between sickness and health, irritation and comfort, and poverty and wealth.

In order to meet the constantly growing demands of the work, more inspectors will ultimately have to be employed. We have an excellent law and an admirable organization but more men are needed to take care of our growth.

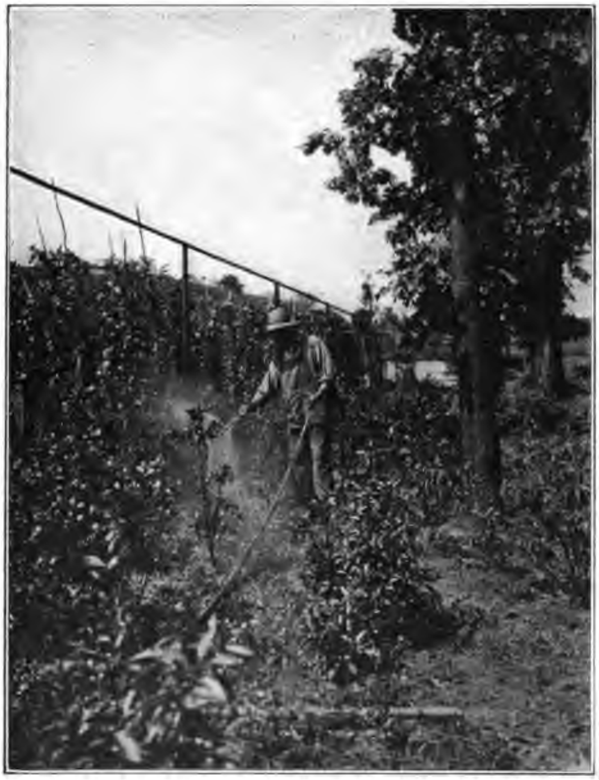
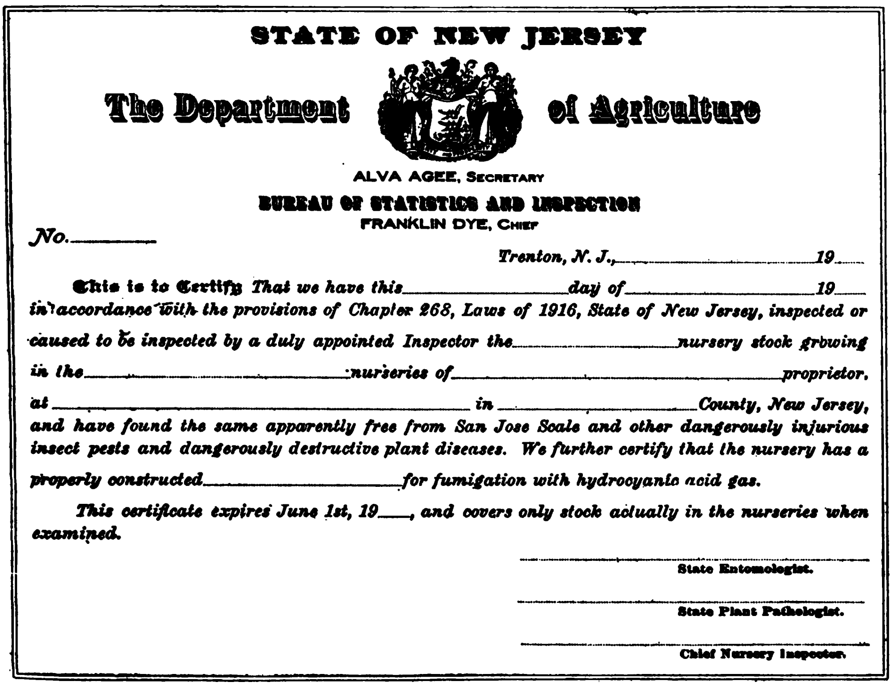


FIG. 11.—SPRAYING LOW PLANTS IN A NURSERY.



STATE OF NEW JERSEY

The Department of Agriculture

ALVA AGEE, SECRETARY

BUREAU OF STATISTICS AND INSPECTION

FRANKLIN DYE, CHIEF

*No.*________

*Trenton, N. J.,*____________________*19*____

This is to Certify *That we have this*____________*day of*______________*19*____ *in accordance with the provisions of Chapter 268, Laws of 1916, State of New Jersey, inspected or caused to be inspected by a duly appointed Inspector the*______________*nursery stock growing in the*______________*nurseries of*______________*proprietor, at*______________*in*______________*County, New Jersey, and have found the same apparently free from San Jose Scale and other dangerously injurious insect pests and dangerously destructive plant diseases. We further certify that the nursery has a properly constructed*______________*for fumigation with hydrocyanic acid gas.*

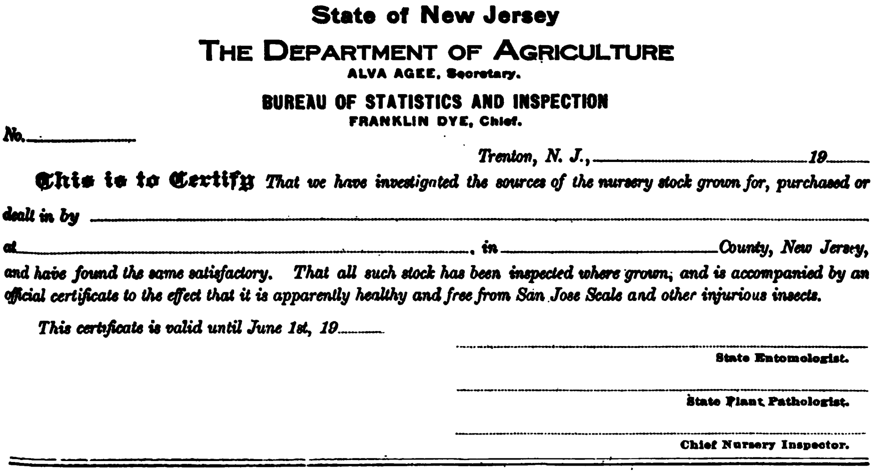
*This certificate expires June 1st, 19*____*, and covers only stock actually in the nurseries when examined.*

____
State Entomologist.

____
State Plant Pathologist.

____
Chief Nursery Inspector.

FIG. 12.—BLANK FORM OF NURSERYMEN'S CERTIFICATE.



State of New Jersey

THE DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary.

BUREAU OF STATISTICS AND INSPECTION

FRANKLIN DYE, Chief.

No.________

*Trenton, N. J.,*____________________*19*____

This is to Certify *That we have investigated the sources of the nursery stock grown for, purchased or dealt in by*______________________________ *at*______________*, in*______________*County, New Jersey, and have found the same satisfactory. That all such stock has been inspected where grown, and is accompanied by an official certificate to the effect that it is apparently healthy and free from San Jose Scale and other injurious insects.*

*This certificate is valid until June 1st, 19*____

____
State Entomologist.

____
State Plant Pathologist.

____
Chief Nursery Inspector.

FIG. 13.—BLANK FORM OF DEALERS' CERTIFICATE.

STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

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BULLETIN.

No. 3

Farmers'
Selling Organizations
IN
New Jersey

Trenton, N. J., January, 1917

STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

BULLETIN.

No. 3

Farmers' Selling Organizations IN New Jersey

Trenton, N. J., January, 1917

Members of
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FOREWORD

The absence of proper return to producers of food in normal years and the high cost to the consumer have drawn public attention to problems of distribution. Thousands of farmers in our State have tried to improve selling conditions for themselves through the medium of farmers' exchanges, and the Department of Agriculture presents this bulletin of information as an answer to inquiries regarding their methods and degree of success.

ALVA AGEE,
Secretary for Agriculture.

CONTENTS

PAGE
INTRODUCTORY 71
MONMOUTH COUNTY FARMERS' EXCHANGE 73
SOUTH JERSEY FARMERS' EXCHANGE 76
BURLINGTON COUNTY FARMERS' EXCHANGE 78
MERCER COUNTY COOPERATIVE ASSOCIATION 81
METHOD OF FINANCING 82
SUMMARY OF BUSINESS METHODS 83
CONDITIONS NECESSARY FOR SUCCESS 84

ILLUSTRATIONS

PAGE
Fig. 1. Main Offices of the Monmouth County Farmers' Exchange, Freehold, N. J. 76
Fig. 2. The Freehold Warehouse of the Monmouth County Farmers' Exchange 76
Fig. 3. Offices of the Burlington County Farmers' Exchange, at Mount Holly, N. J. 77
Fig. 4. Main Offices and Warehouse of the South Jersey Farmers' Exchange, Woodstown, N. J. 77
Fig. 5. Digging and Loading Potatoes near Freehold, N. J. 84
Fig. 6. Loading Cars for Market 84

FARMERS' SELLING ORGANIZATIONS IN NEW JERSEY

WM. B. DURYEE, JR.

County Superintendent of Farm Demonstration, Monmouth County, New Jersey

INTRODUCTORY.

A study of the farmers' organizations in New Jersey, formed for the cooperative purchase of farm products, shows that the spirit of cooperation is appealing to the producers of this State in their business dealings. Four of these organizations are described in this bulletin and each represents the crystallization of sentiment of men who believe that organized effort, rightly directed, will bring the same success in agriculture that it has in other industries. It may be well for us to study briefly the development of the spirit of cooperation among mankind and its great progress during the last fifty years.

It is not very long ago in the history of this country when each home was sufficient unto itself so far as its material wants were concerned. In this period we had neither competition nor cooperation, as we understand these terms today. The will to live was uppermost in the minds of the family and the securing of sufficient food and clothing was all that concerned them. Each family raised or hunted its food and made its own clothing—and other wants were few.

As time advanced, some individuals specialized in the production of certain commodities which were necessary or useful to other members of the community. These progressive people then began to live, not upon the things which they produced, but upon the profit in the sale of these commodities. From that time we have been and still are passing through a period of great industrial organization in which cooperation has proved its value in the great business enterprises of the country and in which organization has stifled competition. In this period of transition from individual effort to cooperation, the great accumulations of capital have turned to the development of cities and towns, transportation and engineering, rather than to agriculture. This organization has not been effected without exercising a great indirect influence on the farming industry. These large corporations and trusts draw upon the brightest young men who have developed initiative in the open country, for their high-paid executive positions. Manipulations of the food-stuffs market have been made possible by their overcoming the law of supply and demand for their own advantage and in many other ways these interests have affected the life of the whole nation in ways possible for a powerful organization when dealing with the individual.

Agriculture has been affected outside itself by cooperation in another way, namely, by the organization of laboring men into unions. By thus organizing in a small way at first, and later becoming very strong, labor has reached a position where it can demand certain wages and conditions from capital, which are usually better than the wages and conditions on the average farm. The cooperation and unionization of laboring men has thus made conditions for labor in the city so attractive and remunerative that the farmer is unable to get the better class of labor to operate his farm. On the other hand the high rate of wages paid to laboring men makes a better market for farm products. Capital protects itself by putting the increased cost on the manufactured article (which the consumer must pay or go without). Because he is an individual and because prices on his products are so largely determined by the law of supply and demand, the farmer cannot put a price on his goods that will enable him to compete with industrial enterprises in securing good labor, and so he is at a great disadvantage in the labor market. Thus we see how the cooperation of commercial agencies and the cooperation of laboring men have proved so successful for their own interests, and at the same time usually disadvantageous to the farmer, when he comes in contact with them. While the principles of cooperation have been adopted and adapted by practically all the great interests in this country, they have made very little progress, comparatively, in the dealings of farmers with each other and with other interests. This we know has come about because of the close proximity of city people, on the one hand, and the more or less isolated condition of the individual farmer with the independence thus naturally developed, on the other. The readiness with which farm products usually find a market also works against cooperation, and other conditions peculiar to certain locations also are antagonistic. In brief, then, cooperation has secured great benefits for practically all enterprises of the country, except agriculture, where the proper principles have been applied.

Products have been standardized, salesmanship made easier, waste eliminated, and wages increased by organized effort. Upon surveying these results, farmers are wondering whether the same benefits might not accrue to their business if the right principles can be found and applied.

In New Jersey there are a number of organizations which have made use of the principles of cooperation in that a central office acts as a buying and selling agency for a membership of farmers, the office personnel being selected by the farmers. The purpose of this bulletin is to give an idea of each of these organizations, their history, scope of activity and methods, with a description of the conditions necessary for the probable success of cooperative enterprise.

Cooperation in the eastern states has taken a form differing materially from that followed in some western states, notably in California, where the citrus growers' organizations are frequently referred to as models of strong, truly cooperative exchanges. In these instances the non-profit association is the principal type. No effort is made to make the association itself a profit-making scheme, all the savings going to the farmers who are members, in proportion to the amount of business each does through the organization. In the East the principal type of cooperative enterprise has been the stock company and an effort is made to return the stock-holders a dividend, independent of whether they are the people whom the organization is supposed to benefit.

Three organizations based on the stock company plan are the Monmouth County Farmers' Exchange, South Jersey Farmers' Exchange and Burlington County Farmers' Exchange. The Mercer County Cooperative Association is of the non-profit type.

MONMOUTH COUNTY FARMERS' EXCHANGE

The Monmouth County Farmers' Exchange is the oldest and largest of the farmers' associations doing business in the State. The main office of the Exchange is located at Freehold, the center of the greatest potato producing section in New Jersey. Because of the very highly developed state of the potato industry in Monmouth County, these farmers were the first to feel the need of a selling agency which would place the sale of their products in their own hands and make them independent of the dealers who were the principal purchasers. As a result of a thorough study by a small group of potato growers of the possibilities of such an association, an organization was effected in 1908 with a membership of 500, which has increased to 1371 members at the present time. Shares were issued to the amount of $100,000 with a par value of $5.00 per share. In order to keep a few individuals from obtaining control of the organization, there was a proviso that no one could buy more than twenty-shares. This clause was later revoked as the necessity arose for a greater amount of capital.

As has been suggested, the principal business of the Monmouth Exchange is in the sale of potatoes direct from the field to the best markets. Some fruits and vegetables also are sold, especially apples and asparagus. Potatoes are sold to every state in the Union as well as Canada, South America, and Europe. The principal variety handled is the American Giant, a long potato of medium quality, noted for its prolificacy. Large quantities of the round potatoes of the Green Mountain and Cobbler types also are handled. The long and the round potatoes are sold separately, the round-stock grower receiving from ten to twenty-five cents more a barrel than the grower of the "Giant."

During the shipping season the manager is in touch with all the markets of the country by telephone and telegraph, a telegraph operator being located in the Exchange offices. Quotations are given and received by the manager during the day. In the evening the returns from the sales of the Giants and round stock are pooled and each grower receives the same price according to whether he shipped Giants or round stock. No attempt is made to establish definite grades of each sort, but the Exchange does insist upon a good, straight, marketable grade, free from culls, scabby or rotted specimens.

The Monmouth County Exchange does business on a 5 per cent basis both in selling the farmer's products and in buying supplies for him. Part of this is returned to the stockholders in the form of dividends and the actual cost of carrying on the business is about 2½ per cent. This is a very low rate and is made possible not only by doing a very large volume of selling, but also by the employment of the office force and capital during the so-called "off-season" in the sale of farm supplies, especially fertilizer. This greatly reduces "overhead" charges and in fact makes a business enterprise of this kind feasible. Three large warehouses with a total area of 39,000 square feet are located at Freehold (fig. 2), Marlboro and Hightstown. These are used mainly as mixing houses for high-grade fertilizers. In 1915 the Exchange sold over seven thousand tons of this commodity.

At the present time the paid-in capital stock is $75,450. No more stock is sold, but a membership card is issued allowing any farmer to do business through the organization for a term of five years. This certificate costs $5.00 and is issued to eliminate the great amount of office work required in making out dividends, etc., for holders of but one or two shares.

The directors are now contemplating reopening the books of the Exchange and allowing farmers not now stockholders to purchase shares at par value. At the present time (December 1916), the surplus is more than the paid-in capital stock, as the result of a very successful year's business. The directors have voted to divide this surplus among the present stockholders by declaring a 100 per cent stock dividend, payable February 15, 1917, which increases the paid-in capital stock, making 30,180 shares at a par value of $5.00. Thus each shareholder receives another share for each one he now owns and in addition a cash dividend of 5 per cent has been declared.

The business record of the Monmouth County Exchange has been one of constant growth and expansion, increasing from $454,414.11 in 1908 to $1,254,613.49 in 1915. The number of shipping stations in 1908 was nine and is now thirty-one. This increase in the number of shipping stations was thought advisable by the directors, because by operating in practically the whole potato section of central New Jersey outside buyers were prevented from purchasing potatoes at a low figure and under-quoting the Exchange, and also because of a demand upon the part of farmers in each locality that they might have the benefits of the Exchange at their place of business. All business of the organization with farmers is done upon a cash basis or upon a well secured note. This is an important feature as it enables purchases to be made upon more favorable terms and prevents losses through bad accounts.

One practice of the Monmouth County Farmers' Exchange deserves mention. This is the system of notifying the loading agents at the various shipping points when the market is weak or weather conditions unfavorable, asking them to request shippers to hold up their shipments until the market has had an opportunity to clear up and the demand to strengthen again. This practice is gaining in favor with the potato growers and it has had a great influence in maintaining a steady price-level.

The trade-mark of the Monmouth County Exchange is a triangle within a circle, bearing the words "Monmouth County Farmers' Exchange." The standard brands of fertilizer put out by the organization are known as the "Triangle Brand" goods and have an excellent reputation throughout the county.

The office force now required by this organization to transact business amounting to one and a quarter million dollars in 1915, is composed of a manager, assistant manager, secretary-treasurer, assistant secretary-treasurer, stenographer, bookkeepers and two general inspectors.

The president is Mr. H. V. M. Dennis and the manager Mr. O. J. Walker.

SOUTH JERSEY FARMERS' EXCHANGE

The South Jersey Farmers' Exchange has a main office at Woodstown in Salem County. This Exchange was organized in 1909 for the purpose of selling the produce and buying supplies for the farmers living in the vicinity of Woodstown. Woodstown is in the center of a rich agricultural district, the principal money crop being round varieties of white potatoes. There are also many large dairies in this vicinity which demand quantities of concentrated feed. For the convenience of its members the Exchange has located large warehouses on railroad sidings at Bridgeton, Mullica Hill, Daretown and Woodstown, where all kinds of feed, fertilizer seeds and other supplies are kept for the convenience of the farmers.

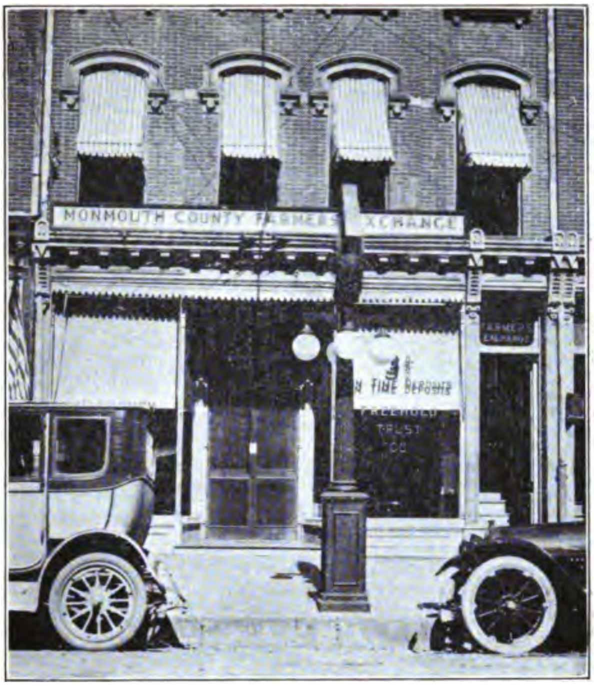

Fig. 1.—Main Offices of the Monmouth County Farmers' Exchange, Freehold, N. J.

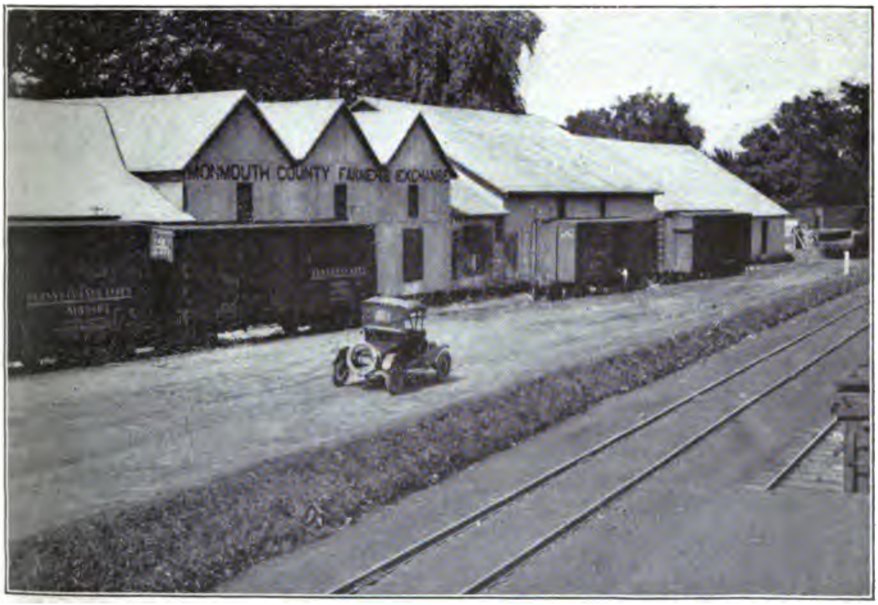

Fig. 2.—The Freehold Warehouse of the Monmouth County Farmers' Exchange.

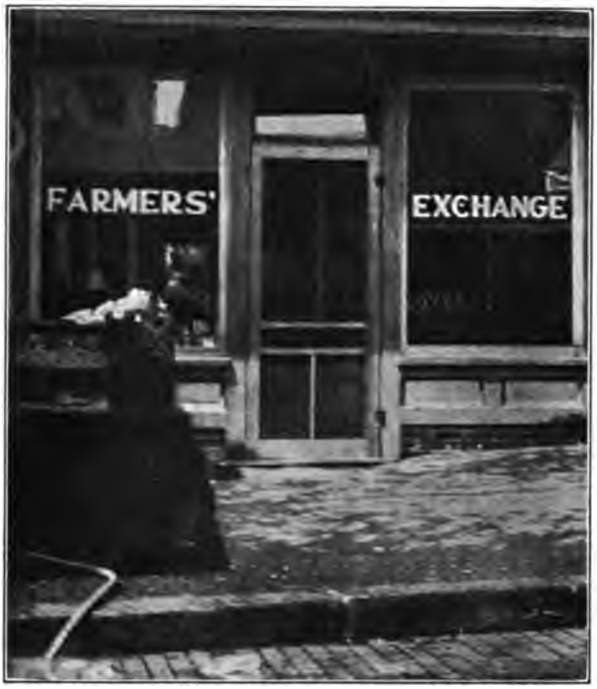

FIG. 3.—OFFICES OF THE BURLINGTON COUNTY FARMERS' EXCHANGE, MOUNT HOLLY, N. J.

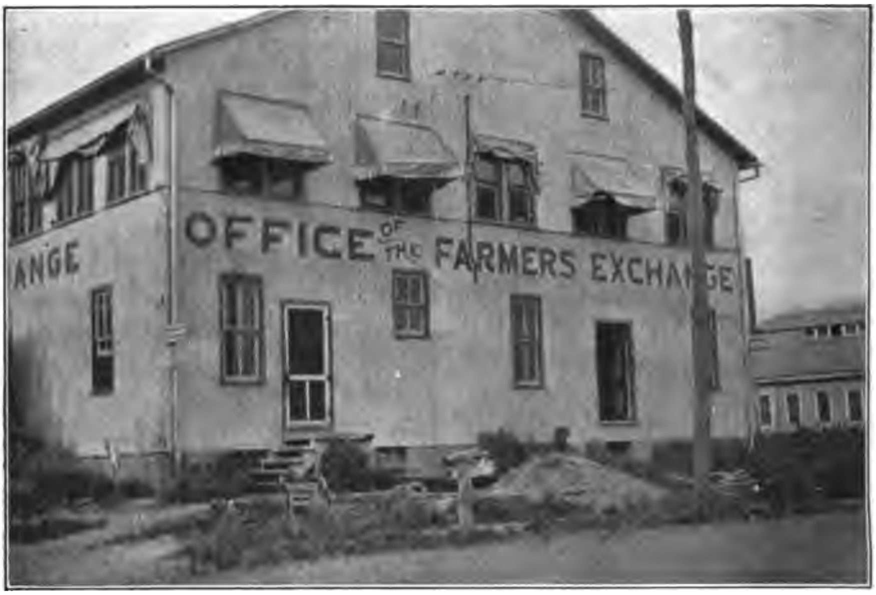

FIG. 4.—MAIN OFFICES AND WAREHOUSE OF THE SOUTH JERSEY FARMERS' EXCHANGE, WOODSTOWN, N. J.

The South Jersey Exchange has seventeen shipping points, all within a radius of 20 miles of Woodstown. The affairs of the organization are controlled by a board of directors, fourteen in number, who represent the whole shipping area. These directors are men who have been interested in the Exchange from the beginning and each looks after the interests of his respective community, helping in the selection of suitable loading agents and inspectors, and keeping in touch with the situation in general.

Shares with a par value of $5.00 are issued to the amount of the capital stock which is $125,000, of which $28,470 is now outstanding. The surplus and undivided profits amount to $58,000. This allows the organization sufficient surplus capital to make all purchases in cash. No individual is allowed to hold more than 150 shares, a limit which is deemed sufficient to safeguard the interests of the organization. There are now 730 members and the business of the Exchange has grown from about $300,000 in 1909 to approximately $1,000,000 in 1915. The principal shipping points are Washington, Baltimore, north to Maine and west to Minnesota, Chicago and St. Louis.

The office force required during most of the year consists of six men, namely, manager, assistant manager, stenographer, bookkeeper, assistant bookkeeper and inspector-salesman. The funds of the Exchange are handled by the manager. During the white potato and sweet potato shipping season this force is increased to twelve so that the added business may be expedited. A large surplus is the aim of all the Exchanges in the State and there is no question as to its value from a business standpoint. Some business is done outside the membership and the profits thus made are put into the treasury.

The South Jersey Farmers' Exchange is located very favorably for doing a year-round business because of the large trucking and dairy interests in that part of Salem County. During 1915 the Exchange sold approximately 8,000 tons of high-grade fertilizer and nearly 8,000 tons of feed.

This Exchange differs from the others, in that it has established three grades of potatoes, the first grade consisting of potatoes of prime size and quality and especially desirable for table use. The second grade includes potatoes of good quality, clean and bright, but either over or slightly under size and not to be classed as extra fancy. The third grade includes the culls which are too small to be included with the other two grades. Practically all the potatoes marketed by this organization are placed in bright, clean sacks bearing the trade-mark of the Exchange known as the "Square" brand and bearing the words "South Jersey Farmers' Exchange." The president of the Exchange is Mr. Asa Moore, and the manager, Mr. Frank Davis.

BURLINGTON COUNTY FARMERS' EXCHANGE

The Burlington County Farmers' Exchange is an organization of farmers living almost exclusively in Burlington County. It acts as the growers' agency in the sale of farm produce raised by the members and in the purchase of farm supplies. The principal business of the Exchange is in the sale of potatoes, strawberries, pears, apples, peaches, cabbage, peas, beans and hay. Potatoes are handled on a 5 per cent basis and are largely sold direct to points in New England and as far west as Pittsburgh. Perishable products, including vegetables and fruits, are consigned to commission houses in cities where the manager has reason to think that prices are best. These are sold on a commission of 10 per cent, and the Exchange is remitted 3 per cent for its services by the commission merchant. Thus there is no reduction in the cost of marketing perishable produce through the Exchange as the usual charge made by commission men for handling produce is 10 per cent. There are two advantages, however, which are important. First, the Exchange manager is in a position to know which cities offer the best markets for produce at certain times, as he is constantly in touch with them. This prevents the sending of peaches, for instance, to a market which is already glutted and allows them to go to a market which may be short of peaches. The second advantage is that by patronizing the Exchange the producer is helping his own organization and incidentally himself, because the 3 per cent commission goes into the treasury of the Exchange and helps to defray the cost of maintaining the organization.

The Burlington County Exchange has recently acquired a large storehouse where supplies of fertilizers, lime, insecticides, seeds, crates, baskets, hampers and barrels are kept on hand for the convenience of the farmers.

These supplies are also handled on a 5 per cent basis and has proved a profitable end of the business. The sale of these commodities during the months when shipping produce is at a standstill gives employment to the office force and reduces the "overhead" charges which would otherwise soon consume the profits made during the comparatively short shipping season extending from the latter part of July to the end of September.

This planning of the work of an organization, so that an office force of reasonable size will not be overwhelmed with work at one season and without occupation at another season is especially important. A farmers' organization must be conducted on business principles if it is to be successful, and the president or manager or both must determine upon a policy which will enable the organization to do the greatest volume of business at a minimum expense.

Located at Mount Holly, the Burlington County Exchange is in the center of a prosperous farming section with a widely diversified and intensive agriculture. This diversification has developed a business which gives the organization a comparatively long shipping season and at the same time creates a demand for commercial fertilizer, lime, insecticides, and other supplies, keeping the office force occupied throughout the year. In 1915 the Burlington County Exchange sold 3100 tons of high-grade fertilizer to its members at a considerable saving to them.

The Exchange uses both floors of a frame building in Mount Holly for conducting its business. The regular office force consists of a manager, secretary-treasurer, stenographer, bookkeeper, salesman and chief inspector. During the shipping season local inspectors are employed to superintend the loading of the produce, the routing of cars and the inspection of the quality of the various commodities. These inspectors report to the manager, giving him information upon which he bases his quotations for the sale of the individual cars. There are fifteen shipping points, all located within a radius of 10 miles of Mount Holly. The manager is constantly in touch with these shipping points and knows what kind and grade of produce is being loaded at each station.

Each morning during the shipping season, the manager receives quotations from the nearby markets and plans the day's shipments according to the relative strength or weakness of these markets. The Burlington Exchange ships principally to points in New England and as far west as Pittsburgh. Because of its location in southern New Jersey the organization is selling products which are greatly desired at the shipping season in more northern latitudes. This accounts for the fact that practically no shipments are made to southern points, they being well supplied by other trucking sections which market their produce at almost the same time as the Burlington County organization.

The Burlington County Farmers' Exchange was organized in 1909 by a group of farmers who believed they should control the sale of their own produce and perhaps prevent the disastrous gluts in local markets. These gluts frequently resulted in such sudden and severe lowering of prices that it became unprofitable to harvest the produce and it was left to rot. This group of men worked up a plan of organization and decided to sell shares to farmers at a par value of $5.00 each. No restriction is placed on the number of shares each individual may own and a member of the organization is entitled to one vote for each share of stock he holds, provided this does not exceed fifty shares. This voting restriction is intended to keep the control of the organization in the hands of a comparatively large number and prevent its passing into the hands of a few or possibly one individual with harmful results to the organization, thus defeating the very purpose for which it was founded. The organization started with a membership of 205 and now has a membership of approximately 900, all of whom are residents of Burlington County. The paid-in capital of the Exchange at the time of this writing was about $20,000. The business transacted, including both buying and selling, during the past three years has been as follows:

1913	$276,347
1914	321,172
1915	267,635

The decrease in the business for 1915 was due to low prices received for all kinds of produce during that season.

Practically all the business done is transacted with and for the members, although in outlying sections of the county or at times in order to make up full car-loads, some business is done with producers who are not members of the Exchange. Care is taken, however, that this does not conflict with the interests of the members and it forms a small part of the business actually transacted during the year.

No attempt is made to enforce definite grading of produce. Every effort is made to make a good, marketable grade of produce, keeping out culls and inferior stock. It was attempted to establish two grades of potatoes some time ago, one being called "A" grade and the other "B" grade. This was later given up as impracticable.

The affairs of the Burlington Exchange are controlled and managed by a board of directors who are elected by the members. Each shipping station is represented by a member on this board, making a body of fifteen men in all. Mr. E. E. Logan is president of the board of directors and Mr. F. E. Embree is manager of the Exchange.

MERCER COUNTY COOPERATIVE ASSOCIATION

The latest farmers' association to organize for the purpose of selling produce and buying supplies, is the Mercer County Cooperative Association with headquarters in Trenton. This association was incorporated in September, 1915, under the liberal laws of New Jersey providing for the formation of associations not for pecuniary profit. This means that the association does not become a profit-making organism in itself and that all profits are divided among the members at the end of each fiscal year. With this kind of association no dividends are paid. At the same time the trustees or directors are protected from liability by incorporation in the same manner as the directors in other corporations which are formed for pecuniary profit.

The affairs of the Mercer County Cooperative Association are controlled by a board of trustees composed of six men, who are elected by the membership from different townships so that the whole county is represented in the conduct of the affairs of the association. The association does a large business, conducted on a cash basis in purchasing supplies for its members. This enables the association to buy in a better market than where credit must be extended and has proved very satisfactory. A small percentage is charged by the association for doing business for its members, depending upon the commodity handled. At the end of the year, overhead expenses are charged against the funds that may be in the treasury and the remainder is divided among the members as profit, less not more than 25 per cent which may go into a reserve fund upon the vote of the Trustees.

Each member of the Mercer County Cooperative Association has one vote in the selection of trustees and in deciding upon methods of conducting the business. The office force consists of a paid manager and bookkeeper and at each of the seventeen loading stations the association has a district representative, who is paid a small commission, depending upon the amount of business done. These district representatives are the spokesmen for the association in their respective territories and work up membership and business among their neighbors.

The principal business of the Mercer County Cooperative Association is now done in acting as the farmers' purchasing agent for seed potatoes, Montana alfalfa seed, grass seeds, fertilizers, chemicals, lime, feed and other supplies. The association has not yet developed the selling possibilities under its charter and by-laws.

METHOD OF FINANCING.

There are two distinct methods of financing these exchanges—that is providing the organization with sufficient capital to carry on business without being hampered by lack of funds. The most common method is the formation of a stock company. The board of directors decides upon the capital stock necessary and then divides this capital stock into shares usually having a par value of five dollars. These shares are sold until all the capital stock is subscribed for or as much of it as the directors deem advisable. The Monmouth County, South Jersey and Burlington County Farmers' Exchanges were organized under this plan.

These exchanges are frequently called "cooperative" principally because the word "cooperative" seems to be naturally associated with farmers' selling organizations. Moreover, the expression "cooperative" as it is used in every day affairs, is very frequently a misnomer. It is sometimes even used to express the sale of a more or less valuable commodity by selling chances at so much each to individuals. The true cooperative association, however, is formed on a non-profit basis. No effort is made to sell stock, to pay dividends or to accumulate any surplus in the treasury beyond that needed for the transaction of business. No one receives financial benefit except those who ship their produce through the organization or buy supplies through it. The necessary funds to transact business may be raised by a contribution by each member in proportion to the produce he has to ship, by assessing him a certain percentage to be taken from his monetary returns, by membership dues or in other ways. At the end of the year the surplus, if any, may be divided *pro rata* among the members, according to the amount of business done with the association during the year; or a certain amount may be deposited in the treasury, upon vote of the directors. If there is a deficit, this is made up by assessments upon the members. The Mercer County Cooperative Association is organized under the latter plan and is truly cooperative. Both plans have their advantages and each should be thoroughly studied before a plan of organization is decided upon.

The laws of New Jersey contain specific provisions for the organization of stock companies for transacting business. There is also an act respecting the formation of associations not for pecuniary profit. Both forms may be incorporated and full information may be secured from the Department of State, State House, Trenton.

SUMMARY OF BUSINESS METHODS

The foregoing description gives the operating methods of four organizations which are the largest in the State and are typical of some others which have not been mentioned. In a study of them we note certain features of similarity which have stood the test of time and have proved essential.

A good-sized board of directors (in these instances composed of from six to seventeen members) is necessary for the general management of the association. The larger number of directors seems to be generally preferred, and when drawn from different parts of the shipping territory they become a representative body, insuring impartiality in the dealings of the organization with its members. The board of directors acts in an advisory capacity to the manager, upon whom the heaviest burden of responsibility falls and who is the highest salaried officer of the organization The manager is employed in all cases throughout the year. His office force consists of a stenographer, one or more bookkeepers, and a general inspector. An assistant manager is apparently necessary when the annual business reaches a half-million dollars. The manager does not handle the funds of the organization, this part of the work being done by the treasurer, who is appointed by the directors. The treasurer is required to give a bond and is paid a salary of varying amount. The president of the organization presides at the meetings of the board of directors and calls these meetings whenever he deems it advisable. The president usually serves without salary.

As a rule business is done on a 5 per cent basis: that is, the exchange will keep five cents out of every dollar which passes through its hands and this is put in a fund to defray the expenses of the organization. As a rule, products put up by certain manufacturers such as insecticides, lime and some other farm supplies are sold at the same prices by the exchange as by the local retail dealer, by, agreement with the manufacturer or jobber of such goods. This protects the local dealer and gives the organization the same profit as the retailer.

CONDITIONS NECESSARY FOR SUCCESS

The probable success or failure of a farmers' organization depends upon several factors which we discover in the study of the exchanges described above.

The organization is most successful when it is located in a region of highly intensive agriculture. This gives the management the sale of commodities of relatively high commercial value and the more money the association handles, the greater are its profits. It is significant that all the exchanges described are located in potato-growing sections, a crop which is readily marketable in very large quantities and which is also of high commercial value as compared with the cereals, for example, which are grown in extensive farming regions.

The location of an exchange in an intensive farming region also means that it will do a large business in all kinds of farm supplies including fertilizers and insecticides. This gives employment to the capital and office force of the organization throughout the year and makes possible the transaction of an annual business at a very low cost. The officials of all the exchanges emphasize the importance of the farm supply branch of the work from a business standpoint, and it unquestionably is an important factor to consider in the organization of a farmers' association.

The environmental conditions necessary to success in a farmers' organization have been dwelt upon in this bulletin. It must not be forgotten, however, that the foundation of every such association must be in the determination of a few men, who assume the bulk of the responsibility, to carry through the organization at all hazards. Time must be freely spent by these men and private funds sometimes risked in the achievement of their purpose. The spirit of service and sacrifice has, and always will, characterize the cooperative efforts of farmers, if the organizations are to be successful and along right lines.

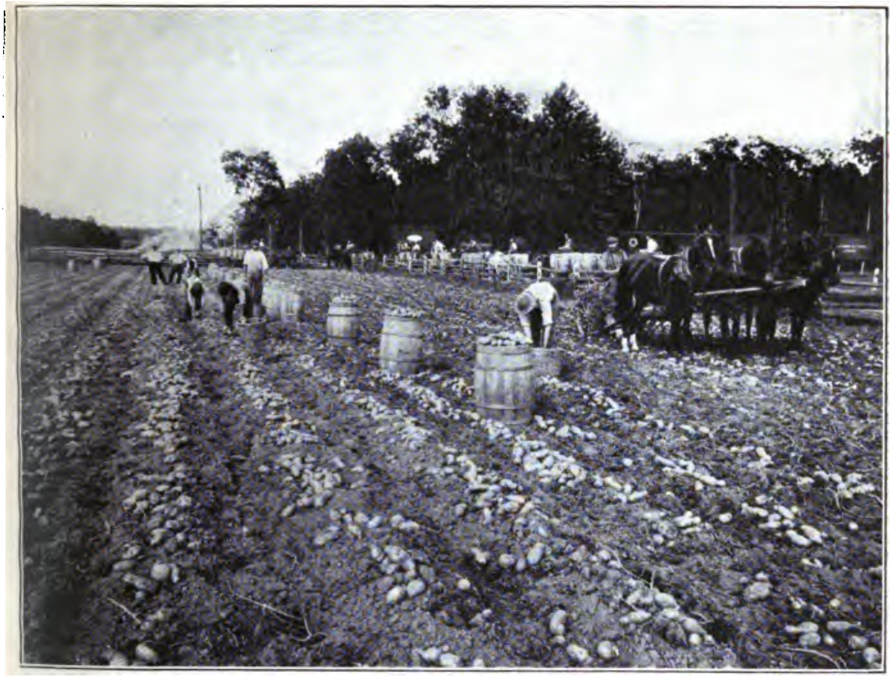

Fig. 5.—Digging and Loading Potatoes near Freehold, N. J.

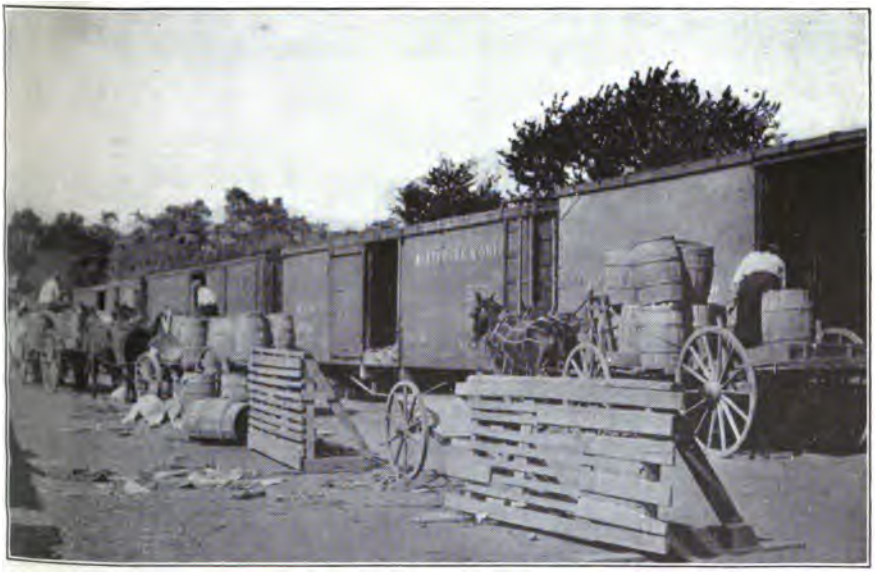

Fig 6.—Loading Cars for Market.

STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

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BULLETIN.

Number 4

Seed Potatoes

Trenton, N. J., February, 1917

STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

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CONTENTS

PAGE

Introduction 89

Sources of Seed 90

History of the Potato 90

Methods of Seed Improvement 91

Points of Importance in Inspection 94

  Varietal Mixtures 94

  Type 94

  Vigor 94

  Diseases 94

Home-Grown Seed 98

High Grade Seed 99

Handling 100

Treating 100

Seed Treatment 100

Methods for Soil Treatment 101

Potato Spraying and Dusting 104

New York Certification 106

Maine Certification 108

Inspection and Certification in Other States 110

Do Not 110

Publications on Potato Growing and Potato Diseases 111

ILLUSTRATIONS

PAGE

Fig. 1. The Seed Certification Tag Used in Maine........ 109

Fig 2. Cross Section; Showing Discolorations........ 112

Fig. 3. Spraying on Minch Bros.' Farm with Tractor Sprayer, Bridgeton, N. J. 112

Fig. 4. Spraying on Minch Bros.' Farm, Bridgeton, N. J., with Power Sprayer, Using Gasoline Engine........ 112

SEED POTATOES

MELVILLE T. COOK, Ph.D.

Plant Pathologist, New Jersey State Department of Agriculture

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INTRODUCTION

Potato growing is one of the very important agricultural industries in New Jersey. In some sections of the State it is the leading agricultural industry. In recent years the heavy losses due to partial or complete failures, the recognition of destructive diseases, and the great variation in crops apparently due to the difference in character of seed from different sources, have given rise to a demand for more reliable seed. This demand for better seed exists not only in New Jersey, but in practically all those potato growing districts which are more or less dependent upon the northern potato growing sections for their annual supply of seed. This has resulted in efforts on the part of the northern growers to meet the requirements of their southern trade.

The New Jersey growers recognize the great differences in vigor, amount of disease and productiveness in seed from different sources, and there is a growing demand for better seed. The writer began the study of potato diseases in New Jersey in 1912 and has devoted a considerable part of his time to this subject each succeeding year. In August, 1915, he attended a meeting of plant pathologists interested in potato diseases, held in Aroostook County, Maine, and in August of 1916 he made a trip through the potato growing districts of Vermont and Eastern New York for the purpose of studying the methods of seed production. This publication is an effort to summarize the results obtained in seed production up to this time, and to give an account of what has been accomplished and what the workers in this subject hope to accomplish.

The progressive grower wishes to produce the largest possible crop and the best quality of potatoes at the least possible expense. It is now very generally believed that this increase in yield and improvement in quality may be accomplished more readily by using high grade seed than by any other method. The principles in the improvement of the seed are (1) reduction of the amount of diseases, (2) increased vigor and productiveness, and (3) trueness to type.

SOURCES OF SEED

There are but two main sources of seed for New Jersey and states farther south, viz.: northern-grown seed and home-grown seed.* Most of the seed is from the former source and most potato growers believe that this will continue to furnish the main supply, but many are hopeful of development of methods for the production of larger quantities of home-grown seed.

HISTORY OF THE POTATO

The potato is recognized as one of the most important of our food plants, but it has been cultivated by civilized races for only about 150 years. It is a South American plant, which was discovered by the early Spanish explorers, growing in the mountainous regions of Chili and Peru. Although originally found in the tropical parts of America, it was restricted to the high, cool, mountainous districts and is really a temperate climate plant. It was introduced into Europe at a very early date but the tubers were small, and the people were slow in learning to use them. Therefore, its development as an important food crop was very slow. It is now very generally used throughout the civilized world, and most people would find it difficult to prepare the three meals of the day without this important article of food.

The fact that it was originally a temperate climate plant, thriving best and producing most abundantly in the short seasons of cooler countries, is the most logical explanation of the great value of northern-grown seed in potato producing districts of the warmer parts of the country.

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*The New Jersey growers sometimes purchase seed from Pennsylvania and states farther south.

METHODS OF SEED IMPROVEMENT

The methods in use for seed improvement are:

1. Plant breeding.
2. Tuber selection or grading.
3. Field selection.
4. Hill selection and seed plat.
5. Field inspection and certification.
6. Use of second crop seed.

1. *Plant breeding* is a method used almost entirely by the specialist and has no true place in this discussion. Those interested in this line of work should read Bulletin 195 (May 20, 1915) of the Bureau of Plant Industry, United States Department of Agriculture, on "Potato Breeding and Selection," by William Stuart.

2. *Tuber selection or grading* consists of selecting tubers of good size and shape which are apparently free from scab, rots, scurf and such other diseases as may be evident on the tubers. This is the method very generally practiced by growers and dealers because it is easier than any other method. A slow demand very naturally resulted in rather careful grading, and a large demand in a correspondingly less degree of care. It will be readily seen that with this method vigor, high yield or foliage diseases could not be taken into consideration. It should be combined with field selection, hill selection and field inspection.

3. *Field selection* consists of a more or less critical examination of the growing crops and the selection of such fields or parts of fields as show vigor, high yield, and a small amount of disease. Such selection is usually made by the grower or buyer and no attempt is made to estimate quality on a percentage basis. This work does not require a technical, scientific training but can be done with profit by a close observing, practical grower. Buyers, associations, granges and exchanges in New Jersey can well afford to send reliable inspectors into those seed-producing districts in which the seed is not grown under a system of official inspection and certification. Where this method is employed, the

foliage diseases which are likely to appear in a mild form in northern districts and in a severe form in southern territory, are usually not taken into consideration. In fact, very few growers and dealers can be expected to detect mild forms of these diseases. It is not as satisfactory as certification and should always be followed by careful grading.

4. *Hill selection and seed plat methods* are used by the progressive seed grower for the purpose of improving his own stock. The first step in this method consists of the selection and marking of a number of good hills during the growing season. These hills are harvested separate from the main crop and only those are selected which produce a good yield of potatoes, of good size and shape. These tubers are used in the seed plat the following year. Some growers combine this method with the *tuber unit* method, which consists of cutting each tuber lengthwise into four pieces, and planting in successive hills so that the crop from a single tuber or part of a tuber may be harvested separately. The two methods can be combined very readily by selecting five tubers from each hill, cutting each tuber lengthwise into four pieces which should be planted in successive hills.

Various modifications of this method are used in many places with good results. Although there may be some question concerning the increasing of the yield of productive strains, the method has the great advantage of eliminating weak, diseased and low yielding plants.

This method of seed improvement must be conducted by the grower who wishes to produce high grade seed potatoes. In many cases the increase in yield repays for the extra time and labor, and the southern planter can well afford to pay a higher price for this seed than for ordinary seed.

5. *Field inspection and certification* has been adopted in many states. It is in reality official field and tuber selection conducted on a percentage basis according to rules. It usually consists of three inspections as follows:

First Inspection:—At the time of blooming to determine the number of missing hills (which is frequently an indication of poor germination), freedom from varietal mixtures, and the amount of such diseases as "black leg," "leaf roll," "mosaic," "curly dwarf," etc. In case the amount of varietal mixtures and diseases is not too great, the grower is permitted to "rogue" out the undesirable plants.

Second Inspection:—At the end of the season before the foliage has died or has been killed by the frost to detect the same diseases as at the first inspection, and also the "late blight" (*Phytophthora infestans*). Determination of productiveness may also be estimated at this time by digging and weighing a certain number of hills from various parts of the field.

Third Inspection:—After digging or just before shipping to determine the amount of "scab," rots and other tuber diseases.

These inspections should be made by well trained inspectors who are familiar with the diseases in question. Trained men will be able to detect and eliminate many weak and diseased plants which most growers and dealers cannot be expected to recognize. It will be readily seen that official inspection and certification increases the cost of seed production. In most cases this expense is borne by the grower. Therefore, the buyers of inspected and certified seed must expect to pay a higher price than for ordinary seed.

The success or failure of certified seed does not rest entirely with the producer or the inspector. The very best seed may be injured in storage, during shipment or after reaching the point of destination. Certification does not mean that the seed is absolutely free from disease or true to type, but that the amount of disease and varietal mixtures is reduced to a minimum. Some diseases are as common and severe in New Jersey as in the northern seed-producing districts, or even more abundant. The prevalence and severity of diseases is influenced by the soil and climatic conditions. And unfortunately there is always the possibility of careless inspection and dishonesty on the part of growers and dealers.

It sometimes occurs that uncertified seed gives as good results as certified seed, or better, but this is to be expected. A great deal of the uncertified seed could have been certified if the grower had made application for inspection and certification.

Certified seed sold in New Jersey on the average has given much better results than uncertified seed, but several cases have been reported in which the results were unsatisfactory. The seed purchased through local seed potato growers' associations, where it has been grown under some recognized supervision, has proved more satisfactory than ordinary seed. County farm demonstrators in seed-producing states have done some very excellent work in directing and supervising the seed improvement work of their counties.

Some confusion has arisen because of the federal quarantine and inspection of Maine seed potatoes which was in force from August 1, 1914, to March 4, 1915. This inspection and certification was for "powdery scab" only, and had nothing whatever to do with varietal mixtures, vigor or diseases.

POINTS OF IMPORTANCE IN INSPECTION

Varietal Mixtures

Potatoes grown for the southern seed trade should be true to type within the group (e. g. Rural group, Green Mountain group, etc.). A mixture of late maturing varieties in a field of early potatoes reduces the yield and market value of the crop.

Type

Seed potatoes should conform to the type reasonably well in shape, color and size. Tubers with pointed or wedge-shaped ends and those that are "waisted" are not satisfactory for seed. The greater the uniformity in size, the more desirable the potatoes are for seed purposes. Tubers weighing from 2 to 8 ounces are of ideal size.

Vigor

Missing hills, weak plants and plants with a low yield in a field of potatoes usually indicate seed tubers low in vitality, and the crop from such fields should not be certified. But it should be remembered that these conditions in fields of market potatoes in New Jersey may be due to causes which cannot be overcome by inspection, such as freezing, overheating, etc.

Diseases

Diseases are the most important causes of lack of vigor and poor yields in the New Jersey potato crop. These diseases are due primarily to fungi and bacteria, but some of them are due to unknown causes. Those that are caused by fungi and bacteria are likely to be influenced by soil and climate in the same manner as the potatoes on which they grow are influenced by these factors.

The writer is inclined to believe that some of these diseases are of less importance on crops grown in the extreme northern parts of the country than on crops grown in New Jersey and states farther south. Some organisms that cause diseases live in our New Jersey soils and cannot be eliminated by inspection.

These diseases may be divided into two groups, foliage diseases and tuber diseases, but in some cases the same disease may attack both foliage and tuber.

Leaf roll is primarily a leaf disease, or rather a disease in which the most important symptoms appear on the foliage. This disease was at first confused with "Rhizoctonia," "stem-blight" and "Fusarium wilt." The margins of the leaves of diseased plants roll upward and show a yellowish color, frequently tinged with red or purple. The diseased plants do not necessarily die early, but in mild forms may be comparatively large and vigorous in appearance. The growth is more or less checked, dependent upon the severity of the disease. The yield is reduced, and in severe cases there may be no tubers, or only a very few small ones which are sometimes clustered about the base of the stems in the same manner as in some cases of Rhizoctonia. Aerial tubers are occasionally formed in the same manner as in cases of Rhizoctonia. The cause of this disease is unknown, but it is known that it can be carried in the seed tubers, although it cannot be detected in them. The only satisfactory method of control to be recommended at this time is the use of seed from healthy plants. Hill selection and field inspection are important factors in reducing this disease.

Mosaic is a foliage disease in which the leaves are crinkled and frequently mottled so as to show alternating areas of normal green and yellowish tints. Severely diseased plants are frequently smaller than normal plants and the yield greatly reduced. The cause of this disease is unknown, but it can be carried in the seed tubers and the control is the same as for leaf roll.

Curly dwarf is a disease in which the plants are small, erect, curly and bushy. Those who have made a special study of the disease recognize four fairly distinct types: one which is an advanced stage of leaf roll, a second which is an advanced stage of mosaic, a third in which the plants are small, weak but not deformed, and a fourth in which there is a shortening of the stem and leaf veins, and a curling downward of the leaf margins. These dwarfed plants produce few or no tubers. At least three types of this disease can be carried in the seed. The plant that produces one or two sizeable tubers is the one that causes the trouble. Field inspection is the only satisfactory method of control.

Note: It will be readily seen that until we know more about *leaf roll*, *mosaic* and *curly dwarf*, our only means of control consists of hill selection by the seed grower in order to eliminate these diseases as far as possible; and of careful inspection and roguing of fields from which the crop is to be sold for seed purposes.

Black leg is a disease of both foliage and tuber. It is common in certain northern districts and is a very severe disease of Cobblers in New Jersey. (For description see Circular 53 of the New Jersey Agricultural Experiment Station.) Tubers carrying this disease produce weak plants which usually die early, producing few or no tubers under our New Jersey conditions. It is the cause of many missing hills and weak plants. Advanced stages of this disease can be detected on the tubers, but it has been demonstrated that careful inspection and roguing in the northern districts result in less of this disease in the New Jersey crop.

Late blight is also a foliage disease which causes a rotting of the tubers (see page 97).

Wilts are primarily tuber and stem diseases, which are more or less evident at the second inspection. Diseased plants should be rogued out. However, organisms causing these diseases may exist in our New Jersey soils. (For description of the wilt diseases, see Circular 53, New Jersey Agricultural Experiment Station.)

The *Southern bacterial wilt,* which is occasionally the cause of losses in New Jersey, is not found in the northern seed potato districts.

Common scab is a tuber disease which is carried on the tubers and persists in our soil from year to year. It is so common and so widely distributed throughout the country that southern growers are not justified in asking for its elimination by the seed producers. They are, however, justified in asking for reasonably clean potato seed, but should always treat their seed before planting (see page 100).

Powdery scab is a European disease that has gained a foothold in Canada and some of the northern districts of the United States. Experimental evidence indicates that it is of little or no importance in New Jersey and states farther south. However, until we know more about this disease it should be removed as far as possible from seed potatoes.

Rhizoctonia or *scurf* was one of the most important diseases in New Jersey in 1915 and 1916. It is well known that the organism causing this disease can be carried on the tubers and that it is very common in the soil and attacks a large number of different kinds of plants. (For description see Circular 53, New Jersey Agricultural Experiment Station.) It is so common and so widely distributed that very little can be done toward its elimination on seed potatoes. Its presence on the seed tubers does not indicate that it will be equally severe on the next crop. It is probably influenced by soil and climatic conditions and may be more or less severe. All seed potatoes should be treated by the buyer with formaldehyde or corrosive sublimate before planting (see page 100), the latter treatment being the more satisfactory.

Silver scurf is a disease which thus far has proved of practically no importance in New Jersey. Its presence does not disqualify seed potatoes from certification. (For description see Circular 53, New Jersey Agricultural Experiment Station.)

Potato wart is a European disease which so far as we know has not gained a foothold in this country, but has become established in Newfoundland and some neighboring islands. The United States Government has established a quarantine against countries in which this disease is known to exist.

Rots due to many causes are more or less common in seed potatoes and should be eliminated as far as possible.

The *late blight rot* is frequently found in seed potatoes shipped into New Jersey from northern points. The disease frequently occurs on the growing crop in the mountainous districts but rarely, if ever, occurs on the crop in the lowlands. In the southern half of the State these diseased tubers rarely, if ever, produce plants, and their presence in the seed potatoes results in missing hills. The nature of this disease is such that it is difficult to give it a percentage rank in certifying seed. However, any considerable amount of it in the growing crop in the north should cause its rejection for seed purposes. (For description see Circular 53, New Jersey Agricultural Experiment Station.)

The *dry rots* should be eliminated from seed as far as possible.

Spindling sprout is a peculiar disease in which the tuber produces spindling sprouts and weak plants. The cause, or causes, are not definitely known, but the disease is more common in southern than in northern-grown seed.

Internal brown spot, internal blotch, net necrosis and other internal discolorations of the tuber are more or less common. They should be eliminated by both northern and southern growers as far as possible.

Black heart may be due to any one of several causes, but the most common cause is over-heating. A temperature of 99° to 104° F. for 24 hours will cause the black heart. It may result from overheating in storage or in shipping. Seriously injured tubers will not germinate. It cannot be controlled by inspection.

Hollow heart is more or less common with some varieties especially the large varieties when grown in very fertile soil. It is associated with rapid growth and may result from soil or weather conditions. It cannot be controlled by inspection.

HOME-GROWN SEED

The growing of the "second crop seed" has been practiced in New Jersey and other states for many years. This method consists of holding northern seed in cold storage and planting early in July. The crop thus produced is held until the following spring and planted for the early crop. Field studies show that it matures from ten days to two weeks later than the crop from northern seed, that there are fewer missing hills and much less of certain diseases, especially black leg. This freedom from disease is very readily explained. We have previously stated that northern-grown seed infected with black leg and late blight fails to grow, or produces weak plants which do not bear tubers;

therefore, these diseases are almost or entirely eliminated in a single planting. The increase in yield over the northern seed is largely due to this lack of missing and diseased plants. Some growers hold a small amount of the second crop seed for late planting and thus continue the growing of home seed from year to year.

We do not have enough experimental data to determine to what extent New Jersey can grow her own seed and to what extent she must remain dependent upon northern seed-producing states, but the growing of "second crop seed" is undoubtedly profitable for the South Jersey grower of the Irish Cobbler.

HIGH GRADE SEED

The very best grade of seed potatoes is none too good for New Jersey growers. How shall we secure them? It is very evident that there is a great difference in seed potatoes and it appears that certified seed and other seed which has been grown under supervision gives uniformly good results.

The New Jersey grower should know something about the origin of his seed. If possible he should know the name of the northern grower. It is to be hoped that the time is not far distant when all seed potatoes will be shipped in bags, each bag bearing the name of the grower. Seed shipped in bulk and without the name of the grower may be a mixture of good and bad seed from different farms. The New Jersey farmer gets a mixture, or one farmer gets a maximum of the good seed while his neighbor gets a maximum of the poor seed at the same price.

Having used great care in securing good seed, the New Jersey grower should use every possible precaution in handling it. It should be protected from frost and over-heating; should not be handled roughly; should be treated with formaldehyde or corrosive sublimate; carefully inspected during cutting; treated with sulfur or land plaster; properly planted, cultivated and protected from insects and fungous diseases.

HANDLING

If certified seed is not properly handled it may give very poor results. Nothing is gained by purchasing certified seed unless the buyer handles it properly. Seed potatoes may be injured by frost or by over-heating in storage, during shipment or by the buyer at the point of destination.

Every reasonable precaution should be taken to prevent cutting or bruising the tubers. Cuts and bruises are subject to infection by organisms causing rots, which are likely to result in missing hills.

TREATING

Seed potatoes should be treated for common scab, Rhizoctonia, black leg and other diseases. Inspection and certification give very little protection against the first two of these diseases and do not eliminate all of the black leg. Therefore, seed potatoes should be treated with formaldehyde or corrosive sublimate. There is some difference of opinion among growers as to the value of these treatments, but experimental evidence indicates that seed treatment can be practiced with profit.

SEED TREATMENT*

It has been demonstrated that it is advisable to treat the seed with formaldehyde or corrosive sublimate for scab, black leg and scurf (*Rhizoctonia*). The fact that these diseases sometimes appear on crops grown from treated seed is not an argument against the treatment. Repeated experiments in many parts of the country prove the advisability of treating the seed. It should be done by the grower.

The most satisfactory method of using ***Formaldehyde*** (Formalin) is to mix one pint (or pound) of the commercial 40 per cent solution in 30 gallons of water and soak the potatoes for 2 hours. This is most easily accomplished by partly filling sacks with potatoes and putting them into the barrels containing the mixture. The mixture can be used eight or ten times. It is not dangerous to handle but it causes an irritation of the eyes and the nose. *Always spread the treated seed in a thin layer so that they may dry as rapidly as possible.* Too long an exposure to the liquid will injure the germination. It is best to give the treatment before the seed sprouts. The treatment will kill most of the sprouts that may be started at the time, but good seed will produce new sprouts.

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*The discussions on (a) Seed Treatment, (b) Soil Treatment, and (c) Spraying are taken from Circular 58 (N. J. Agr. Exp. Sta.), with slight modifications.

Corrosive Sublimate solution is also an excellent treatment for scab on seed potatoes and is more effective against the scurf (*Rhizoctonia*) than the Formaldehyde. Mix 4 ounces of corrosive sublimate in 30 gallons of water and soak the potatoes for 1½ hours. Caution: *Do not mix the solution in a metal container. Corrosive sublimate is a deadly poison, and must be kept out of reach of children and irresponsible persons. The mixture can be used four or five times.*

The cutters should use two knives; one should be kept in a cup of formaldehyde (1 part to 19 parts water) while the other is in use. These knives should be changed frequently and always immediately following the cutting into a tuber showing discolorations, rots or other evidence of disease (fig. 2).

All tubers showing discolorations, rots and other internal evidence of disease should be thrown out.

The practice of dusting cut potatoes with sulfur, gypsum, slaked lime, etc., is quite common among many of the growers in the State. The use of any of these materials results in the more rapid formation of an artificial skin, thus reducing the amount of water lost from the seed piece. Of these materials the sulfur is probably the best, since its fungicide properties are more marked. This treatment is not beneficial when the planting season is cold and wet.

METHODS FOR SOIL TREATMENT

Even before the organism causing potato scab had been isolated, experiments had been conducted in which many substances were introduced into the soil for the purpose of controlling the disease. With the discovery of the organism, the work with soil fungicides was resumed in a more intelligent manner until today we have a considerable amount of accurate data.

Many of the substances tried have been found partially effective but too expensive for commercial practice, others have been found worthless, and others even tend to increase the scab. The influence of some of the more common materials applied to the soil for the control of scab may be summarized as follows:

Barnyard Manure.—Much work has been done upon the influence of barnyard manure upon potato scab with the almost invariable result that the amount of scab is materially increased. Fresh manure is apparently more likely to be injurious than old or composted manure. In general, the higher the rate of application, the greater the amount of scab. There can be little doubt that applications of manure should be made on the other crops in the rotation, rather than immediately before or on the potatoes.

Lime.—This material likewise has been found to favor the development of scab, and applications of lime are not to be recommended on the potato crop. The tendency of potato soil to become acid and the difficulty of obtaining a good catch of clover for a cover crop upon such soils, makes the application of lime necessary at some place in the potato rotation. The best time to apply lime in a potato rotation is immediately after the crop is dug.

Wood Ashes.—This material is but little used at present, and there is little doubt that it is favorable to the development of scab to a marked extent.

The relation of a number of other substances to the development of scab has been investigated. *Kainit* and *potash* salts have been found to decrease the scab. *Bone meal* has been found to increase the scab. *Copper sulfate* (blue vitriol), *mercuric chloride* (corrosive sublimate) and *sulfuric acid* have shown beneficial results in the control of the disease.

One of the most promising of the materials tested, and one whose cost is not prohibitive, has been found to be *sulfur.* Dr. B. D. Halsted, botanist of the New Jersey Agricultural Experiment Station, was among the first investigators to test out this element. His results, and those of many other experimentors, have been very favorable. During the last two years the study of the influence of sulfur has been resumed. A brief summary of some of the phases of the problem which are of practical importance are given at this time in advance of complete statement of the results. (A more detailed account of this work is found in the Annual Reports of the New Jersey Agricultural Experiment Station for 1914, 1915 and 1916.)

(1) Influence of cover crop. The results in 1914 showed an increase in the yield of potatoes of 21.4 bushels per acre on soil which had grown a cover crop over soil where no cover crop was grown. The tests with sulfur on these soils showed that sulfur is more effective on the soil where no cover crop has been grown.

(2) Influence of the time of application. In the work carried out in 1914 a number of tests of this factor were made. Spring application of the material proved a great deal more effective than a similar application made the previous fall. This phase of the problem was carried out for only one year, but the results point clearly to the advantage of making sulfur applications in the spring about the time of planting.

(3) Influence of the method of application. Tests of this phase of the work were carried out in both 1914 and 1915. The results for both years indicate that mixture of the sulfur with the fertilizer not only fails to show much control of the scab by the sulfur, but also a decrease in yield. A comparison of broadcasting "before" and "after" planting was made both years, and which is the better is still an open question. In 1915 the results were in favor of broadcasting before planting.

(4) Influence of the formaldehyde treatment of the seed. The influence of this treatment as outlined in this bulletin (pages 100, 101) has been tested for two years. In testing the effectiveness of sulfur it has been found that the best results are to be obtained with seed previously treated with formaldehyde.

(5) Influence of the form in which the three essential elements, nitrogen, phosphoric acid and potash, are added to the fertilizer. The evidence presented through two years' experimental work on this point has indicated that: (a) sulfur is more effective where phosphoric acid is supplied as acid phosphate than when bone-base fertilizers are used; (b) sulfur makes a larger increase in the per cent of clean potatoes with muriate of potash than with sulfate of potash; (c) the results on the source of nitrogen have been different for the two seasons and are inconclusive.

Applications of sulfur at the rates of 300 pounds per acre and 600 pounds per acre have been used, and in general a marked decrease in the amount of scab has resulted from the larger application. Deleterious effects are sometimes noted on the crops following potatoes, particularly clovers. The injury in no case has been observed for any great length of time. The smaller application, 300 pounds per acre, has not been found to be injurious, and the evidence to date indicates that small annual applications are more satisfactory than one large application. The influence of sulfur in the second year in the control of scab is apparent, but not to as great an extent as in the first year. The acidity of the soil is apparently the most prominent factor in limiting both the benefits and the injury due to sulfur treatment, so that any applications should be made in a small experimental way in each particular field before any extensive control work is undertaken.

POTATO SPRAYING AND DUSTING

An increase in the yield of potatoes due to spraying may be the result of several factors, two of which are:

(1) Control of fungous diseases.
(2) Vine stimulation and invigoration.

The fungous diseases which can be controlled by spraying have been described in the foregoing pages, and studies on vine stimulation have shown that under some conditions it may become an important factor.

Covering these two phases of the spraying problem, the New Jersey Agricultural Experiment Station has tested Bordeaux mixture and sulfur-arsenical dusts. In addition, several of the commercial Bordeaux pastes sold within the State have been used. The meagre tests of these materials have not furnished a great deal of data regarding their relative merits. A safe rule to follow with respect to these materials is to adhere to the printed recommendations of the manufacturers.

Home-made Bordeaux mixture has been the most popular spray material in the big potato-growing sections of the world ever since its efficiency in the control of late blight was established. Extensive spraying work in New York and New England has demonstrated the advisability of its use. In Maine and Vermont the increase in yield due to spraying, even in years when no blights were present, has been quite marked. In the ten years' spraying experiments by the New York Experiment Station, the average increase due to Bordeaux spraying at Geneva was 97.5 bushels per acre for five to seven sprayings per annum and 69 bushels per acre for but three sprayings. On Long Island, where the conditions more nearly approximate those of New Jersey, the increase in yield due to spraying was not so large. An average annual increase of 45.7 bushels per acre was brought about by five to seven sprays, and only 25 bushels per acre from three applications of spray. These results need not necessarily apply to New Jersey conditions. On Long Island the spraying does not pay every year. From our limited experimentation in this State it is probable that spraying would not be commercially profitable every year, but still prove a profitable practice for a period of years.

During the last three years extensive field tests of Bordeaux mixture have been made by the Experiment Station. The results have differed somewhat with the localities and with the variety of potatoes grown. In the two years' work at Freehold, no increases outside of experimental error have been obtained by spraying "Giant" potatoes. These experiments were conducted on one of the richest fields in that district, and high fertility and variety of the potatoes grown have been suggested as probable causes for the failure to obtain material increases in yield.

With Irish Cobbler potatoes the Bordeaux spraying has given more promising results. As high as 61 bushels per acre increase was noted in one experiment. Increased yields have not been obtained in all cases, and with our meagre data and incomplete knowledge of the influence of the character of the seed, of climate, and several other factors, it is not possible to predict a paying increase every year from Bordeaux spraying.

The results of spraying second crop Irish Cobbler potatoes are much more promising. Early blight is quite common in these late planted potato fields, and since Bordeaux effectively controls this fungus, we may expect a larger return from spraying here than on the early crop where this disease is absent.

For the first crop potatoes, the first application of Bordeaux spray should be made when the vines are 6 to 8 inches high. The treatment should be repeated every ten to fourteen days, the time of application depending somewhat upon weather conditions. The largest number of applications of spray per season tested in the experimental work on first crop potatoes is four.

Liquid sprays are best applied at the rate of about one hundred gallons per acre and the best coating of the leaves is obtained with three nozzles to the row. A pressure of at least one hundred pounds per square inch is highly desirable (fig. 3 and 4).

Complete directions for the preparation of Bordeaux mixture are to be found in Circular 48 of the New Jersey Agricultural Experiment Station. A detailed report of the dusting and spraying work of the Experiment Station is contained in the Annual Reports for 1913, 1914, 1915 and 1916, and in Circular 42.

NEW YORK CERTIFICATION

In New York the inspection and certification are under the supervision of the New York State Potato Association. The inspectors are appointed by the president upon recommendation of the department of plant pathology of the State College of Agriculture. Their salaries and expenses are paid by the association. A tax sufficient to cover the expenses of this inspection and certification is levied on the growers who make use of it. All applicants for registration must pay a fee of $2.00, and in case a certificate is issued, an additional fee of 1½ cents per bushel is charged for all potatoes sold under the certificate. All shipments of certified seed must be made in new bags, holding 165 pounds each.

The inspectors make three inspections as follows: (1) when the potatoes are in bloom, (2) as late as possible before the dying of the plants, and (3) after digging.

Fields may be disqualified for the following reasons:

(1) The presence of more than 15 per cent of mosaic at the first inspection or of more than 5 per cent at the second inspection.

(2) The presence, at the first inspection, of more than 10 per cent of any one of the following diseases: wilt, black leg, leaf roll, curly dwarf or hills weak from other causes; or of more than 15 per cent of all combined.

(3) The presence, at the second inspection, of more than 1 per cent of any one, or of 3 per cent of all combined, of the diseases named in (2).

(4) The presence of more than 15 per cent of varietal mixture at the first inspection or more than 1 per cent at the second inspection.

(5) Infestation with early blight, late blight, Colorado beetles or flea-beetles to such an extent as to make identification of other diseases difficult.

The certificate is as follows:

CERTIFICATE OF POTATO SEED INSPECTION NO. —

New York State Potato Association

……………………………Pres. ……………………………Sec.

Kasoag, N. Y. Ithaca, N. Y.

This certifies that the potato fields and seed-stock of……………

……………………………………………………………………………

have been inspected by a representative of the Association and have been found to conform to the standards set by the Association (see reverse side) for seed-stock as regards varietal purity and freedom from disease.

This certificate applies only to the fields inspected and found to conform to these standards. The holder is responsible for conditions developing after the last inspection is made.

This certificate is given only after the grower has made a signed statement that he has fulfilled all the requirements made by the inspector and that he has done, or will do, before shipping, the necessary grading and sorting.

The Association reserves the right to revoke this certificate at its discretion.

The conditions found to exist in the stock covered by this certificate are shown in the inspector's report attached hereto.

(Reverse side of certificate)

Standards of New York State Potato Association for certified seed potatoes:

Freedom from varietal mixture;

Conformity to type of variety as regards vine and tuber characters;

Freedom from wart and powdery scab;

Practical freedom from leaf roll, curly dwarf, black leg and weak hills;

A maximum of 5 per cent mosaic;

Freedom from serious infection with other diseases. (The amount of such infection to be stated in the certification.)

Tubers to weigh between 2 and 12 ounces for late varieties and between 2 and 10 ounces for early varieties;

Good cultural methods;

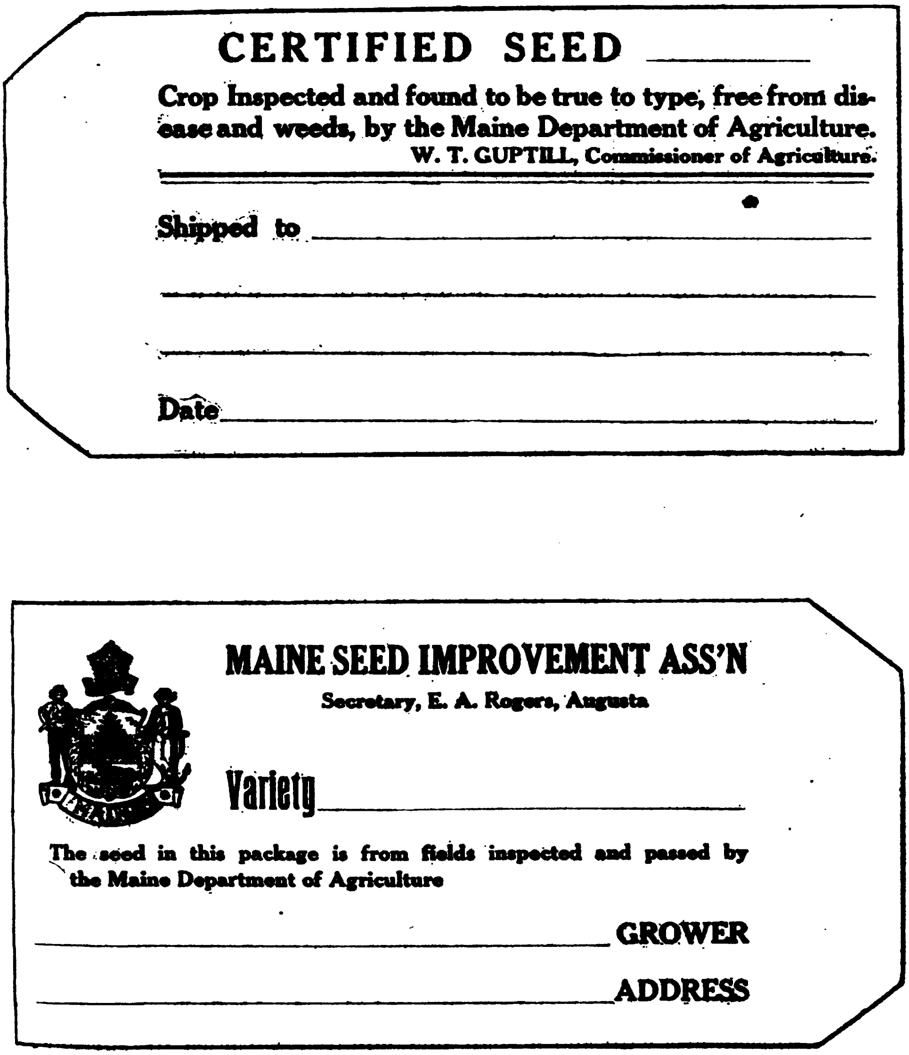
Satisfactory yield for the variety and season.

MAINE CERTIFICATION

In Maine the inspection and certification is under the supervision of the Maine Seed Improvement Association and the Department of Agriculture. The grower pays 50 cents per acre to make an entry, and $1.00 per acre for each of the two field inspections, making the total field inspection cost $2.50 per acre. At shipping time there is a further charge of 5 cents per sack, and the tag is attached to the sack or barrel by one of the Department inspectors. The *blue tag* is shown in figure 1.

The requirements are as follows:

The seed shall be carefully selected and all potatoes showing disease shall be thrown out. There will be a greater probability of the crop passing inspection, if the seed tubers are soaked, before being cut, in a solution of corrosive sublimate—4 ounces in 30 gallons of water—for one and one-half hours. Three inspections will be made. At the first inspection, made at blossoming time, the field will be carefully rogued for black leg, mixed types and weak plants. If more than 80 hills per acre of black leg, 240 mixed hills or 500 weak hills are found, the field will be disqualified for the certificate. At the second inspection which will be



CERTIFIED SEED ________

Crop Inspected and found to be true to type, free from disease and weeds, by the Maine Department of Agriculture.

W. T. GUPTILL, Commissioner of Agriculture.

Shipped to ____________________

____

____

Date ____________________

MAINE SEED IMPROVEMENT ASS'N

Secretary, E. A. Rogers, Augusta

Variety ____________________

The seed in this package is from fields inspected and passed by the Maine Department of Agriculture

____________________ GROWER

____________________ ADDRESS

FIG. 1.—THE BLUE TAG USED IN SEED CERTIFICATION IN MAINE. (THE DIAGRAMS ARE REPRODUCTIONS OF BOTH SIDES OF THE TAG.)

before digging and, if possible, before the plants ripen, over 16 hills of black leg, per acre will disqualify or 80 hills of other varieties per acre. A fair sample shall be dug from the field at this time and if more than 5 per cent of the sample dug show great weakness in yield over the rest of the sample dug, the field will be disqualified for certification.

Note will be made of all diseases found and will be reported by the inspectors to the Department of Agriculture and the Association. A third inspection shall be made before awarding the certificate and the general quality of the tubers noted. No diseased or badly damaged potatoes shall be sold as certified seed stock and no potatoes under-size or over-large for the variety. If powdery scab is found, the certificate shall not be awarded, nor if leaf roll or a large number of hills affected with wilt disease be found. Except in very bad cases, late blight will not disqualify.

INSPECTION AND CERTIFICATION IN OTHER STATES

Vermont, Wisconsin and some other states have regulations governing the inspection and certification of seed potatoes. The great bulk of the seed used in New Jersey comes from Maine and New York, and, therefore, we have given the regulations from these states only. Those interested in securing seed potatoes from other states can very readily secure the necessary information concerning inspection and certification by writing to the state authorities of the states from which they wish to purchase the seed.

DO NOT

Do not buy seed potatoes without knowing their origin and the name of the grower, if possible to obtain it.

Do not buy European potatoes for seed. They are not adapted to our soils and climate. In tests made by the U. S. Department of Agriculture with more than one hundred varieties of foreign potatoes they gave poorer yields than the best American varieties grown under the same conditions. Foreign seed is likely to carry new diseases and may increase our difficulties.

Do not allow your seed to be chilled or overheated.

Do not handle your seed roughly.

Do not neglect to treat your seed potatoes with formaldehyde or corrosive sublimate.

Do not use potatoes that show discolorations when cut.

Do not use poor seed and expect good yields.

Do not plant culls or use small seed pieces.

PUBLICATIONS ON POTATO GROWING AND POTATO DISEASES

From the New Jersey Agricultural Experiment Station:

Circular 20—Potato Growing in New Jersey.
" 42—Spraying and Dusting White Potatoes.
" 53—Potato Diseases in New Jersey.

From the U. S. Department of Agriculture:

Farmers' Bulletin 533—Good Seed Potatoes and How to Produce Them.
" " 544—Potato Tuber Diseases.
Bulletin 47—Lessons for American Potato Growers from German Experiences.
" 81—The Potato Quarantine and the American Potato Industry.
" 176—Group Classification and Varietal Descriptions of Some American Potatoes.
" 195—Potato Breeding and Selection.
Circular 93—The Danger of Using Foreign Potatoes for Seed.

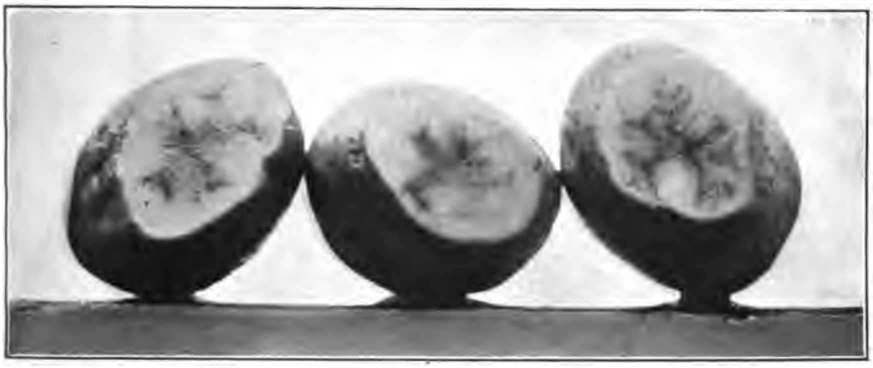


FIG. 2.—CROSS SECTION; SHOWING DISCOLORATIONS.

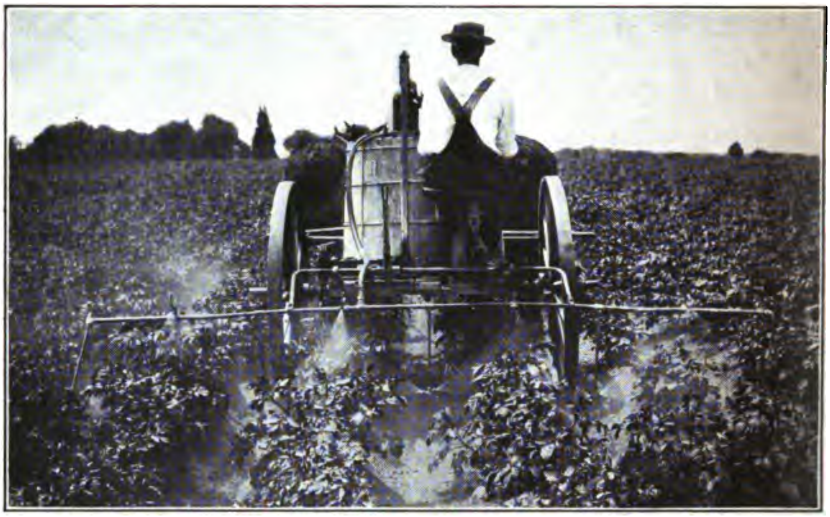


Fig. 3.—Spraying on Minch Bros.' Farm with Tractor Sprayer, Bridgeton, N. J.

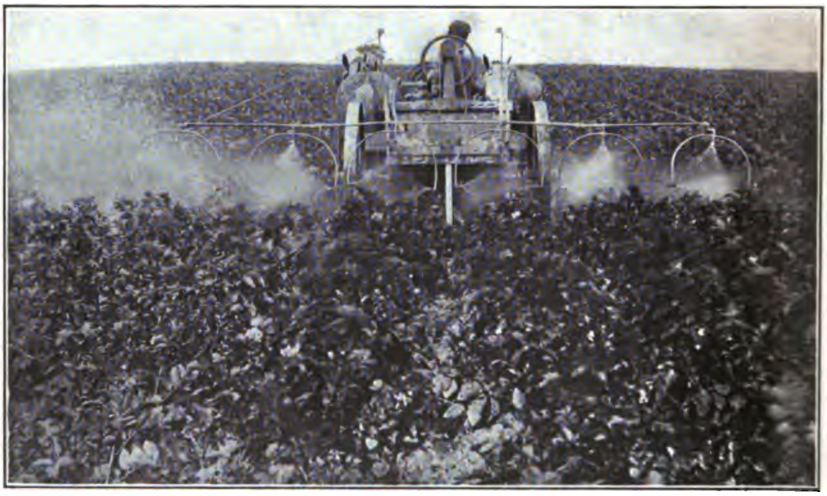


Fig. 4.—Spraying on Minch Bros.' Farm, Bridgeton, N. J., with Power Sprayer, using Gasoline Engine. This Field of Potatoes Was Grown from Late Crop Cobbler Seed, Giving a Yield of over 100 Barrels per Acre of Prime Potatoes.

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STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

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BULLETIN

No. 7

Modern Market Methods

Trenton, N. J., May, 1917

STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

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No. 7

Modern Market Methods

Trenton, N. J., May, 1917

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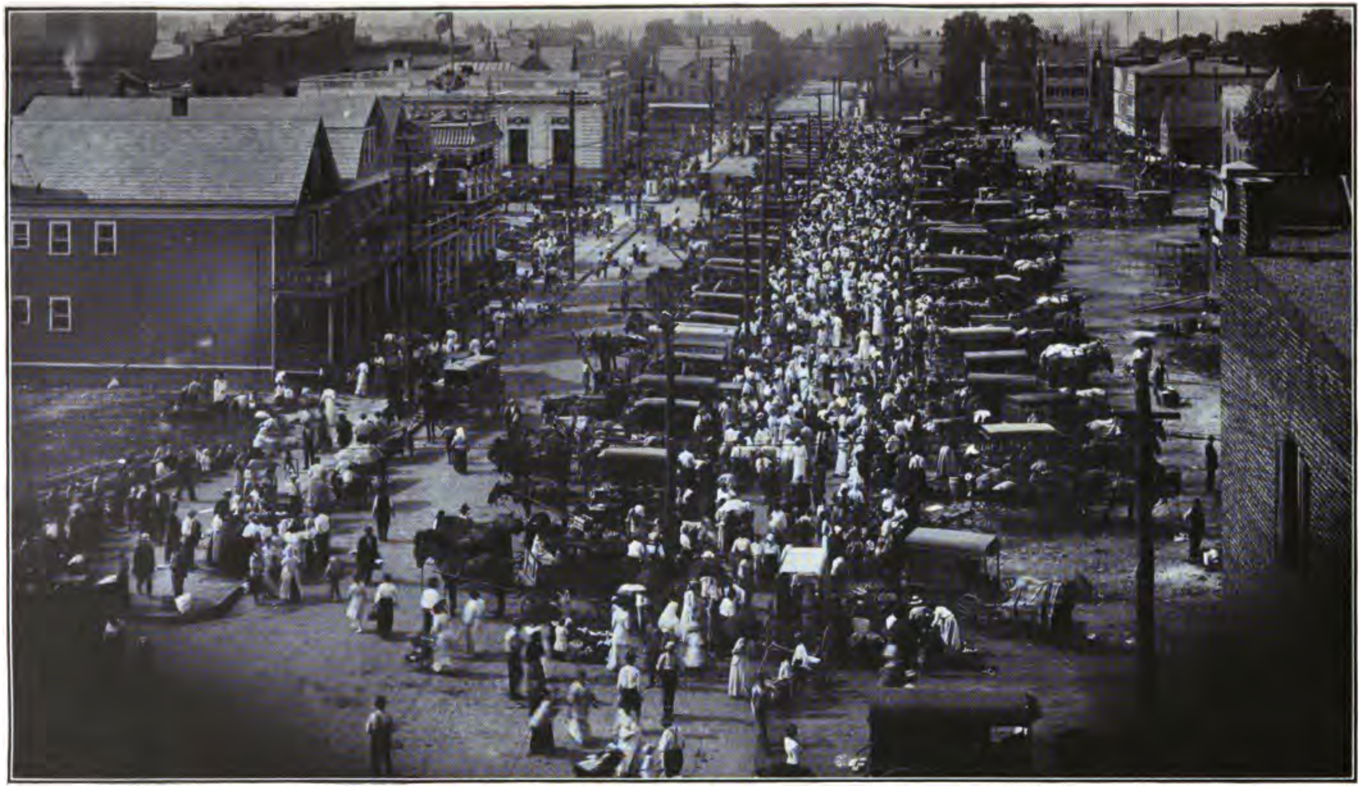
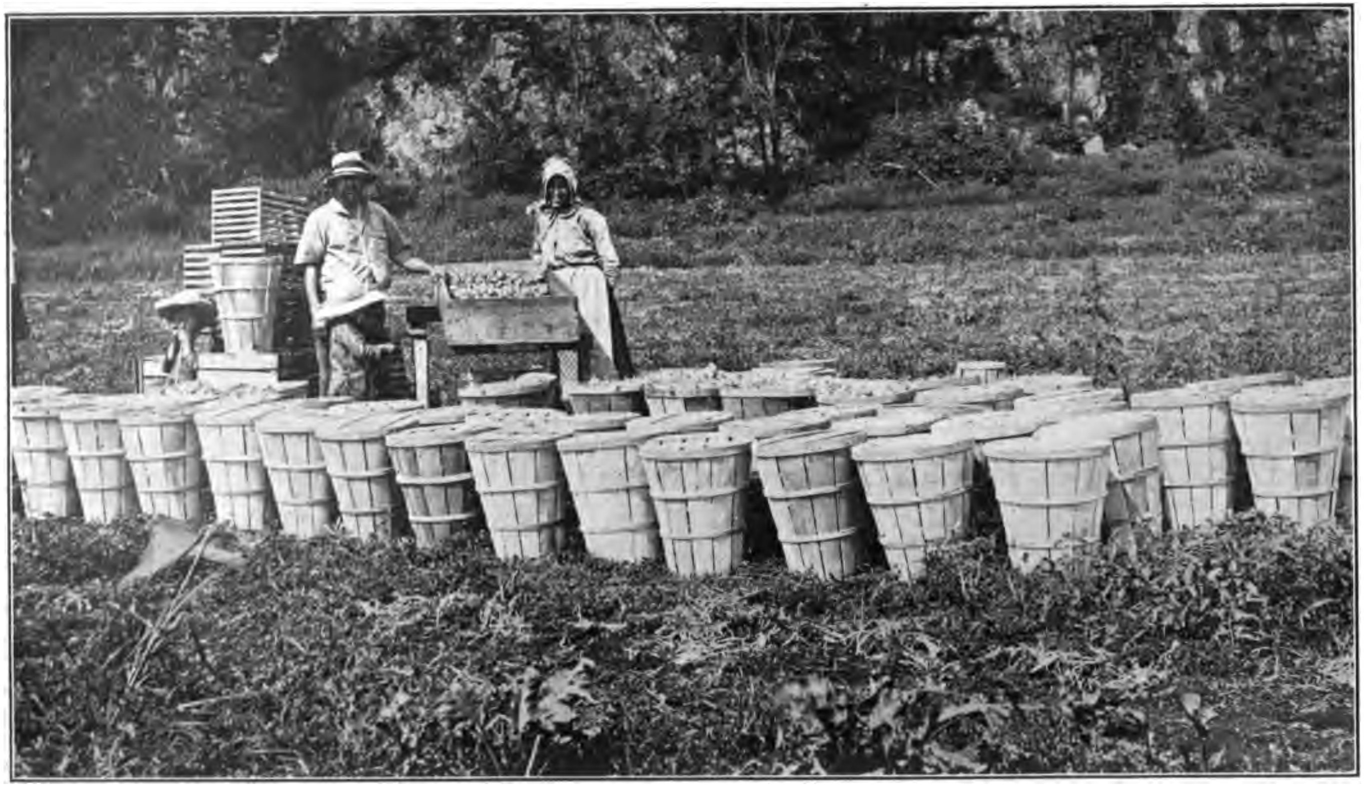
CONTENTS.

PAGE.
Introduction, ... 219
Problems Relating Directly to Production Which Can Be Overcome Only by Farmers, ... 221
City, State and National Standards, ... 222
  Standard Packages, ... 223
  Tomato Packages, ... 224
  Peach Packages, ... 224
  Label Second-Hand Carriers, ... 225
  Jersey Tomatoes in New England, ... 225
  Loose-Bottom Hamper, ... 226
  New Jersey Law on Weights and Measures, ... 227
  Federal Standard Barrel Law, ... 227
  Plain Marking on Packages, ... 228
Coöperative Shipping, ... 228
Problems of Particular Interest to Consumers, ... 230
  Direct Buying, ... 230
  Quantity Buying, ... 231
  Caution as to Huckster Trade, ... 232
  Delivery Costs, ... 232
Municipal Responsibilities, ... 232
  Kinds of Public Markets, ... 233
  Establishment and Regulation of Public Markets, ... 233
  Wholesale Markets, ... 234
  Retail Markets, ... 235
  Financing, ... 235
  Suitable Market Types for New Jersey Cities, ... 236
  Some Well Established Markets, ... 237
  The Need for Open-Air Farmers' Markets at the Present Time, .. 238
Auction Selling, ... 238
Cities May Buy and Sell, ... 239
State Responsibilities, ... 240
  State Supervision of Wholesale Trading, ... 242
Cold Storage Facts, ... 244
Market News Service, ... 244
Educating the Consumers, ... 245
Organization for the Improvement of Farm and City Marketing, ... 245



The Farmers' Public Market in Perth Amboy.



Grading and Packing Onions in the "Great Meadows" District.

MODERN MARKET METHODS

ALEXIS L. CLARK
Chief, Bureau Land, Crops and Markets, New Jersey State Department of Agriculture

Growing interest in market practices and an increasing demand for improvement in our present methods has called for a discussion of the conditions present in the distribution of our food products and a presentation of facts concerning some of the apparently more efficient systems now before the public mind. The entire country has given consideration to distribution problems in late years. Progress has been made in many ways, and yet much greater efficiency can be secured at all points from the place of production to the table of the consumer. In this period of crisis in our national life, when all the world is looking to see what we can do in food production, and when we realize that our ideals of life and liberty depend for continuation upon the food we can furnish to people outside of our own country, it would seem that theory should develop into practice, and that those practices which we know to be good should be placed in actual operation.

Our New Jersey farmers have responded nobly in extending their growing operations this year, and this increased planting is the more noteworthy when we realize that they have no guarantee of a profitable selling price. Indeed, with the thousands of acres planted in small gardens throughout the East, New Jersey fruit and vegetable growers have reason to consider, more carefully than ever, the best possible means of selling. The nearness to great markets and other factors have promoted in New Jersey special farming interests in which the more perishable food articles are produced. While better distribution methods are occupying the attention of thoughtful people of all parts of the country, perhaps the need for improvement is nowhere realized to a greater extent than by the small producers in New Jersey.

Two years ago thousands of bushels of potatoes netted the growers less than 30 cents per bushel; peaches and tomatoes decayed by the trainload on the fields where they were grown, and many acres of peas, beans, etc., remained unharvested. At that same time we know that many people in our great cities, within a few hours' train ride, never had an opportunity to taste these healthful foods.

Our nation has, from its birth, devoted itself to the promotion of agriculture. Evidently, without the stimulus of war times, the demand for some sort of regulated marketing has met with universal approval. Just now, when we may expect national laws to systematize large phases of marketing, may well be considered an opportune time to begin the development of a sense of individual and coöperative responsibility in thrift and marketing efficiency.

Production is closely related to distribution. "Crops well grown are half sold." Many of our farmers find that products of superior quality practically sell themselves. It sometimes appears that the most pronounced agitators for market reform are farmers who do not use special care in producing crops of high quality. At the same time, the fact is becoming recognized by all students of economics that a State must enforce certain regulatory measures and prevent serious waste and unnecessary handling in the distribution of these necessities. We must have fair prices returned to our farmers if we are to maintain a high standard of living in our country districts. We must also furnish to the workers in our great cities food at nominal prices. This, then, is the great aim in view—an efficient system of placing the products of the farm in the homes of the city workers.

By increasing production we do not necessarily secure the desired result. The law of supply and demand operates in controlling prices of foodstuffs much the same as it does with all other commodities, but the perishable nature of some of these goods necessitates certain methods that allow this stabilizing influence to be easily perverted.

The much discussed subject of growing two blades of grass where one grew before has met the rebuff of practical growers that American farmers can do this, and will, when it becomes profitable.

The thousands of uncultivated areas in New Jersey are referred to by some as offering unlimited opportunities for profitable crop production. When the argument is offered that, if this land could be profitably cropped, it would be the "more land under cultivation," the enthusiast cites the growing of vegetables in California and Florida for our eastern markets. A study of this situation will readily show that the system of packing and selling makes possible the successful competition of these fruits and vegetables grown thousands of miles away. By the adoption of standard packages and grades and the practice of modern selling methods, these goods are sold at a minimum expense, and the consumption of them in our eastern markets is increasing each year. We cannot hope to bring about more satisfactory marketing conditions, either to consumer or producer, until a basis of understanding is reached and all work together. Producers must recognize their faults in the growing and packing of their goods. Houeswives must recognize their responsibility, learn the peculiar characteristics of the various crops and demand economical methods in selling.

In order to consider clearly some of the more important phases of marketing, they have been grouped together in this bulletin.

PROBLEMS RELATING DIRECTLY TO PRODUCTION WHICH CAN BE OVERCOME ONLY BY FARMERS

Perhaps nothing is more fundamental in selling than standardization. The adoption of standard grades and market packages has been universal in practically every industry excepting agriculture. In the hardware business screws are sold by the gross, and each manufacturer has a certain style of package which remains permanent and helps to build up a reputation. In the the clothing, furniture and stationery lines large orders are placed by mail or secured with the aid of sample specimens. In farm products there are many examples of this same perfected system, and yet here in the East little has been done to place our business on any such basis. No large buyer orders a carload of apples from a description sent in by an eastern grower, while thousands of cars of western apples change hands annually entirely on paper. We have no standard terms or grades, while the large organizations of growers in the West have adopted universal packages and certain brands and grades which are established permanently and which encourage confidence in the buyers. The methods adopted by the box-apple shippers are much the same as those practiced by Texas onion growers, Colorado cantaloupe raisers, and many other farmers' organizations. The tremendously efficient system of the California Fruit Growers' Association has shown what can be accomplished by applying modern business methods to the distribution of farm products.

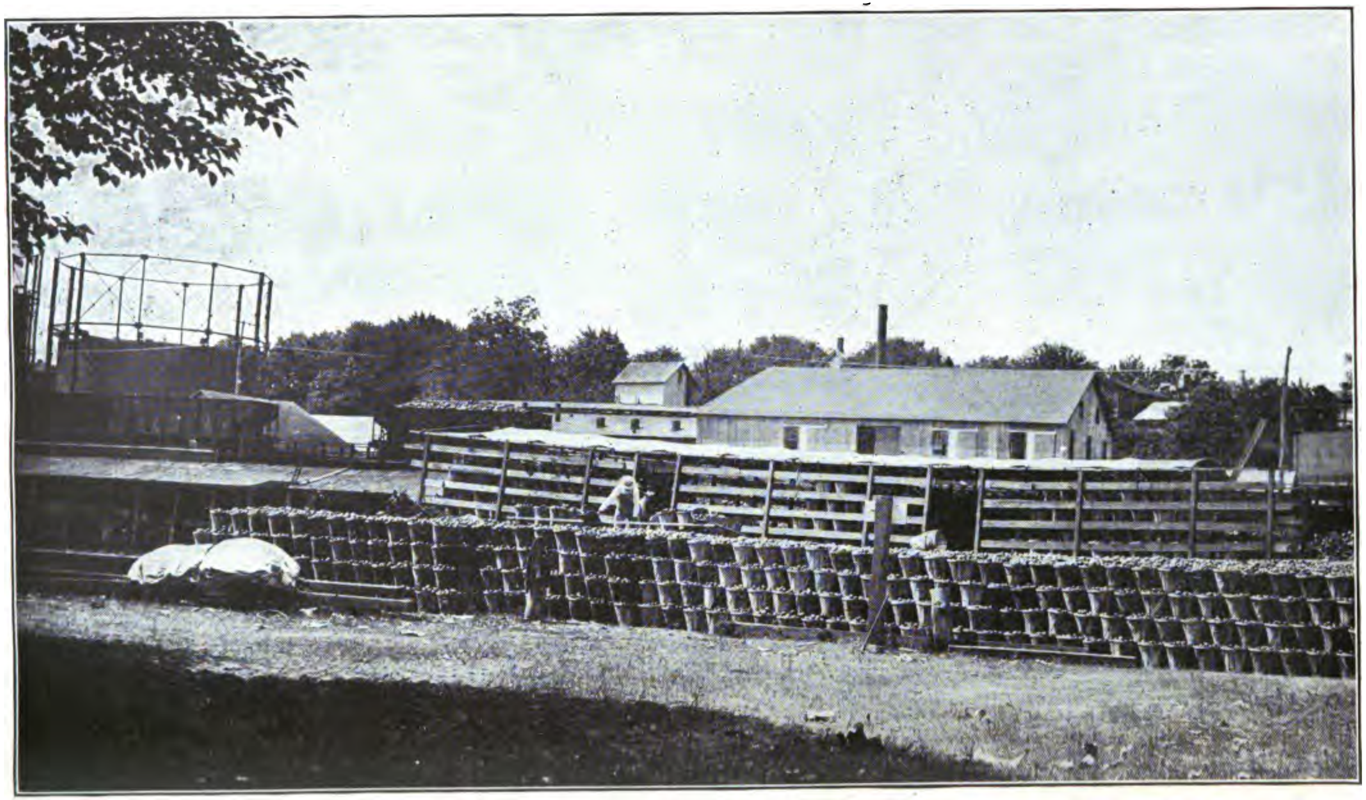
The question naturally arises: Can such methods be introduced in the East and how should a beginning be made?

The first step brings us immediately to the matter of individuality. So long as every grower can grow whatever he likes, pack it in any manner he chooses and sell it according to his own inclination, it is difficult to see how any manner of confidence is to be developed among buyers in our New Jersey products. In sections further removed from eastern markets strict business methods are necessary and growers find that they must sacrifice their personal desires for the common welfare. In this way, and this way only, have they been able to overcome their handicap of remoteness and to compete successfully with the growers on the outskirts of our large cities. There are several reasons why definite grades, market terms and packages become established slowly in such states as New Jersey. In the first place, they are not absolutely necessary. Men with no farming experience can take possession of even a small farm in New Jersey and raise enough products to enable them to eke out an existence with no thought of any other growers. Secondly, the spirit of independence in thought and action is perhaps personified in the highest degree in American farmers. A person must have initiative and the ability to practice self-direction in order to farm at all successfully. In the third place, New Jersey farming is very much diversified. Only exceptional instances can be found where quantities large enough to exert any particular influence on the market of one kind of product is grown. A very interesting development is taking place in some of our eastern states relative to this matter.

CITY, STATE, AND NATIONAL STANDARDS

New York City and some smaller cities have established by ordinance standard grades for milk. National, state and city laws are now in effect throughout the country standardizing weights and measures. New York State took the initiative in passing a state apple-grading and packing law. Within the past year or two similar measures have been adopted by most of our neighboring states. The peach growers in the former state are now considering a law to cover the packing of peaches. To be sure, such rules are established customs in older countries,

Produce Cars Floated Across from Jersey City Terminals to the Piers in New York.



Loading Tomatoes in Bridgeton.

but they are a decided innovation in America. Thus we see that the tendency in the East is for the state to recognize certain problems in distribution as matters of common interest and to legislate accordingly. If standard products are necessary for more efficient market methods, it is difficult to understand how they are to be established in any other manner. Large individual growers of course do not meet the same difficulties as small farmers and it is the thousands of small producers that the cities must look to for their food supply and whom the State should protect and encourage. If the individual considers the state as a coöperative society, and himself as one of its members, state standardization will not seem so "controlled" or "paternal."

It is not plain to the student of present market methods how we are materially to change our distribution machinery. Doubtless, in years to come through wise leadership and persistent efforts more direct methods may be adopted. We must, however, prepare to face present conditions and make the best of them. With permanent grades recognized alike by grower, wholesaler, retailer, and consumer, the cost of distribution is actually reduced. From the Greek who keeps the corner fruit stand to the commission merchant who dares not recommend unknown goods too highly to regular customers, standard grades mean dependability. It is imperative for New Jersey apple growers to appreciate that standard apple-grading laws are now in effect in most of our northeastern states. Standardization of grades in New Jersey, where so many different crops are grown on the same farms and where the types of farming are so different in the same communities, present far greater difficulties than in some of the great western fruit belts. The practice is, however, so commendable and the results so practical that a beginning will undoubtedly be demanded by farmers in the near future. Perhaps among some of the first products to be considered will be apples, milk, peaches and potatoes.

Standard Packages

Many shippers believe that certain products can be very materially helped by the use of better adapted containers. Most new packages introduced in New Jersey have originated with manufacturers' selling agencies. It is not greatly to the credit of our farmers that the loose bottom hamper and the Georgia carrier were almost forced upon them by the manufacturers and the produce dealers. Even the present standard weights and measures act did not originate with those who are most affected and most benefited. For years, unscrupulous hucksters have bought fruit in 16-quart baskets and sold them again in baskets holding but 14 quarts. The cranberry growers through their well-organized society have adopted a particular barrel suited to the purpose.

Tomato Packages

During the summer and fall of 1916 some study was made of packages in New York City. From all information obtainable, it appears that tomatoes shipped from New Jersey in Georgia carriers have brought higher prices than those shipped in either large or small slat crates, or in baskets of any kind.

The average top price for carriers for the month of July was $1.42, August $1.09, and for September $1.11. The average top price for the large slat crates for the month of July was $1.72, for August $1.23, and for September $1.32. The small slat crates, of 5/8 bushels, brought an average price of $0.96 for the month of July, $0.83 for August, and $0.99 for September. The 20-pound climax basket was not handled in New York regularly, or in large enough numbers to allow of a price being quoted later than August 10, but for the four weeks between July 10 and August 10, the average top price was $0.66.

This shows that the average price per bushel for the tomatoes that were sold in carriers for the whole season was about $1.60; the average price per bushel in large crates was $1.42, and in the small crates, $1.50; so that returns to the grower for carriers were about 12 per cent higher than for large crates, and about 7 per cent higher than for small crates.

The Georgia carriers sold at the greatest advance over the small crates early in the season, and at an advance over the large crates for carefully graded tomatoes during the first three weeks of August.

A large percentage of carriers were second-hand packages, and many were slack packed. The round and more firm ripening varieties, properly packed in new carriers, brought the highest prices of all.

Careful packers, using only high-grade tomatoes, can undoubtedly secure the highest market price, especially during the early part of the season, by the use of Georgia carriers.

Peach Packages

A comparison of market prices for peaches shipped from New Jersey to New York in carriers and baskets showed a higher average price for carriers than for either ½-bushel or bushel baskets, through the entire period from August first to October first.

The average top price for carriers for the month of August was $2.67, and for the month of September $2.13. The average top price for the ½-bushel baskets for August was $0.72, and for September $0.80, and the average top price for the bushel baskets for the same periods was $1.21 and $1.35, respectively.

The average per bushel of fruit packed in carriers was $3.20, the average per bushel in ½-bushel baskets was $1.52, and the average in the bushel baskets, $1.31.

This comparison shows the average returns to the shipper per bushel of fruit packed in carriers for the entire season to be about 100 per cent higher than for fruit in any other kind of package.

The demand for carriers in preference to baskets is for the large-sized fruit, the small size often bringing as much per bushel in baskets as in carriers, and the quoted market prices for carriers can be obtained only for graded and properly packed fruit; slack-packed carriers are usually sold for the lowest prices of all.

Label Second-Hand Carriers

Second-hand carriers can often be given a more uniform and less second-hand appearance by stenciling the ends where the former shipper or peach grower's name usually appears; some name, mark or device which will serve to cancel the first user's name and give all the carriers in the second user's shipment a certain uniformity of appearance, or, better still, a label pasted over each end, is recommended.

Jersey Tomatoes in New England

A study of packages used in shipping New Jersey tomatoes to New England and other northern markets has been made. Such tomatoes are chiefly reshipped from New York. Practically all buyers condemn the Jersey tomato crate. The large size is a little worse than the smaller one. Jersey tomatoes are sold to New England and New York State cities for only two or three weeks, but many thousands of crates are handled during this period. Dealers in these cities recommend crates with solid bottom and narrow spaces between slats and ends. New England buyers often speak of Jersey tomatoes as "Jersey Catsup." The Georgia carrier was recommended for strictly high-grade fruit, carefully packed.

Much of the dissatisfaction experienced by experimental shipments of both peaches and tomatoes in carriers has been due to poor packing. Packing fruit in this package is an art, and must be learned by anyone who hopes to use it successfully.

Loose-Bottom Hamper

With the increasing production of early or summer apples throughout the East there has been an increasing demand in the large towns and cities which are supplied with apples direct from nearby orchards, as well as in the New York market, for an apple package smaller than the barrel, but strong enough for shipment, to meet the requirements during August and September, especially of the high-class grocery, hotel and fruit-stand trade.

Of the various packages which have been tried, the ⅝-bushel and 1-bushel hampers, used to a large extent in marketing the early apple crop in New Jersey, and in Delaware and Maryland, have been found the most satisfactory.

The greatest defect, at least in the salesman's estimation, of this style of package is that it does not permit of apples of high quality and color being packed in it so as to present that pleasing appearance when opened which is necessary to make any fruit package an attractive one.

A package which has all the utility of the old-style hamper, but without the defect mentioned, has recently been perfected without adding greatly to the cost or to the labor cost of packing. This is the loose-bottom hamper which permits of the fruit being packed through the small or bottom end of the hamper and faced so as to present the desired appearance when the basket is opened for display.

The use of this hamper for the strictly fancy apples of high color is recommended by growers and shippers who are now using them, and by commission merchants and salesmen in the New York market. If apples of the green or light-colored varieties were graded and carefully packed in these hampers the grower would undoubtedly receive more for his crop than if sent to market in the old-style package.

These hampers are used now in preference to old-style hampers for apples and pears, the only fruit that can be given a better appearance by being packed in these baskets.

Commission men in New York do not advise that they be used for anything else, except for sweet peppers; there is a demand for the very early and for late peppers in baskets, and a strictly fancy grade in baskets might sell throughout the season.

New Jersey Law on Weights and Measures

In 1911 an act was passed by the New Jersey Legislature standardizing weights and measures. A copy of this law, together with regulations pertaining to its enforcement, can be secured from the State Superintendent of Weights and Measures, Trenton, N. J. This law has been amended several times since. Two sections which are of special interest to farmers are printed herewith:

1. No person shall sell or deliver, or have in possession with intent to sell or deliver, any fruit or fruits, berries or vegetables, contained in any basket, box or other container, unless such basket, box or other container shall be of capacity, in standard dry measure, of thirty-two, twenty, sixteen, eight, four or two quarts, or one quart or one pint; *provided, however,* that nothing in this act contained shall be construed to apply to the sale or delivery, or the possession with intent to sell or deliver, of any fruit or fruits, berries or vegetables *contained in any sealed can, jar or bottle,* or which are sold by the *barrel,* except cranberries, which may be sold in standard crates or barrels, of the standard measure as provided by the act to which this act is a further supplement.

2. No person, except as hereinbefore provided, shall sell or deliver, or have in possession with intent to sell or deliver, any fruit or fruits, berries or vegetables, contained in *any basket, box or other container,* unless such basket, box or other container shall have legibly marked on the outside thereof, by the manufacturer thereof, in English letters or Arabic numerals, the *exact capacity* of said basket, box or other container, and unless said basket, box or other container shall also contain the name and address of the manufacturer thereof, painted or written thereon, legibly in the English language; *provided, however,* that any manufacturer of any such baskets, boxes or other containers may mark thereon, in lieu of his name and address, a sign or symbol furnished him by the Superintendent of Weights and Measures of this State.

Federal Standard Barrel Law

The Federal Government has a standard barrel law, which went into effect July 1, 1916. It embodies the following provisions:

Section 1. That the *standard barrel* for fruits, vegetables and other dry commodities other than cranberries shall be of the following dimensions when measured without distention of its parts: Length of stave, twenty-eight and one-half inches; diameter of heads, seventeen and one-eighth inches; distance between heads, twenty-six inches; circumference of bulge, sixty-four inches, outside measurement; and the thickness of staves not greater than four-tenths of an inch; *provided,* that any barrel of a different form having a capacity of seven thousand and fifty-six cubic inches shall be a standard barrel. The standard barrel for cranberries shall be of the following dimensions when measured without distention of its parts: Length of staves, twenty-eight and one-half inches; diameter of head, sixteen and one-fourth inches; distance between heads, twenty-five and one-fourth inches; circumference of bulge, fifty-eight and one-half inches, outside measurement; and the thickness of staves not greater than four-tenths of an inch.

Section 2. That it shall be *unlawful* to sell, offer or expose for sale in any State, Territory or the District of Columbia, or to ship from any State, Territory or the District of Columbia to any other State, Territory or the District of Columbia or to a foreign country, a *barrel* containing fruits or vegetables or any other dry commodity of *less capacity* than the standard barrels defined in the first section of this act, or subdivisions thereof known as the third, half and three-quarters barrel, and any person guilty of a willful violation of any of the provisions of this act shall be deemed guilty of a misdemeanor and be liable to a fine not to exceed $500, or imprisonment not to exceed six months, in the court of the United States having jurisdiction; *provided, however,* that no barrel shall be deemed below standard within the meaning of this act when shipped to any foreign country and constructed according to the specifications or directions of the foreign purchaser if not constructed in conflict with the laws of the foreign country to which the same is intended to be shipped.

Section 3. That reasonable variations shall be permitted and tolerance shall be established by rules and regulations made by the Director of the Bureau of Standards and approved by the Secretary of Commerce. Prosecutions for offenses under this act may be begun upon complaint of local sealers of weights and measures or other officers of the several States and Territories appointed to enforce the laws of the said States or Territories, respectively, relating to weights and measures; *provided, however, that nothing in this act shall apply* to barrels used in packing or shipping commodities sold exclusively by *weight* or *numerical count.*

This law will be enforced by the State Superintendent of Weights and Measures.

Plain Marking on Packages

The marking of packages should receive more attention from the shipper, especially where small lots are sent by rail to large markets. Perishable goods are usually transferred from car to wagon and store during the evening and early morning hours. It is done in a hurry by artificial light, and mistakes are frequently made. Plain marking prevents such mistakes considerably.

COOPERATIVE SHIPPING

This is a phase of eastern farm marketing which has been extensively discussed for many years. Its advantages are easily recognized, but as a general practice it has developed slowly. The last ten years have witnessed several very marked successes in this line.

A bulletin by this Department entitled "Farmers' Selling Organizations in New Jersey" can be secured by anyone interested. Within the past year or two several smaller groups of farmers have organized for this work and have experienced most satisfactory results. This practice is one which should receive serious consideration throughout the State. The work accomplished at Vineland and at Middletown could with profit be copied in many communities. Apparently, the first factor necessary for such organization must be a recognized need for improvement. A common interest, such as a group of apple growers, potato raisers or truck farmers have, is a great help to a coöperative enterprise. A hard and fast agreement to do certain things in the interest of all is the most difficult thing for our farmers to sign. In a little effort at Middletown, in Monmouth County, a coöperative agreement was made among about 15 men as a tentative proposition for the first year. The demands and requirements were made as easy as possible. In the second year, however, the articles of organization were strengthened, and it was required of all to ship all produce through the association.

The strongest point from a business and economic standpoint in this method of marketing is the saving possible in stopping competition. Under usual conditions, products from many near neighbors actually compete against each other. Buyers use one grower's prices to break the price set by another grower.

Another advantage gained by this plan of selling is the impression made upon a market by such a quantity of uniform products. The quality of such goods reaching a market in quantity and with such uniformity secures recognition, and if of the kind sought for by buyers is readily taken care of. In fact such products coming from New Jersey associations have frequently been sold before arrival, the sales being made on the advices of shipment wired from the loading point.

The wonderful results secured by coöperative movements in foreign countries, western states and in our own state go to prove that this is a method which is bound to grow and which should appeal to shippers all over New Jersey.

The Bureau of Markets is prepared to advise with small groups of growers, to bring to them experienced men from outside to discuss the obstacles which may be expected, and if possible to furnish a state-paid man to act as assistant for the first entire shipping season.

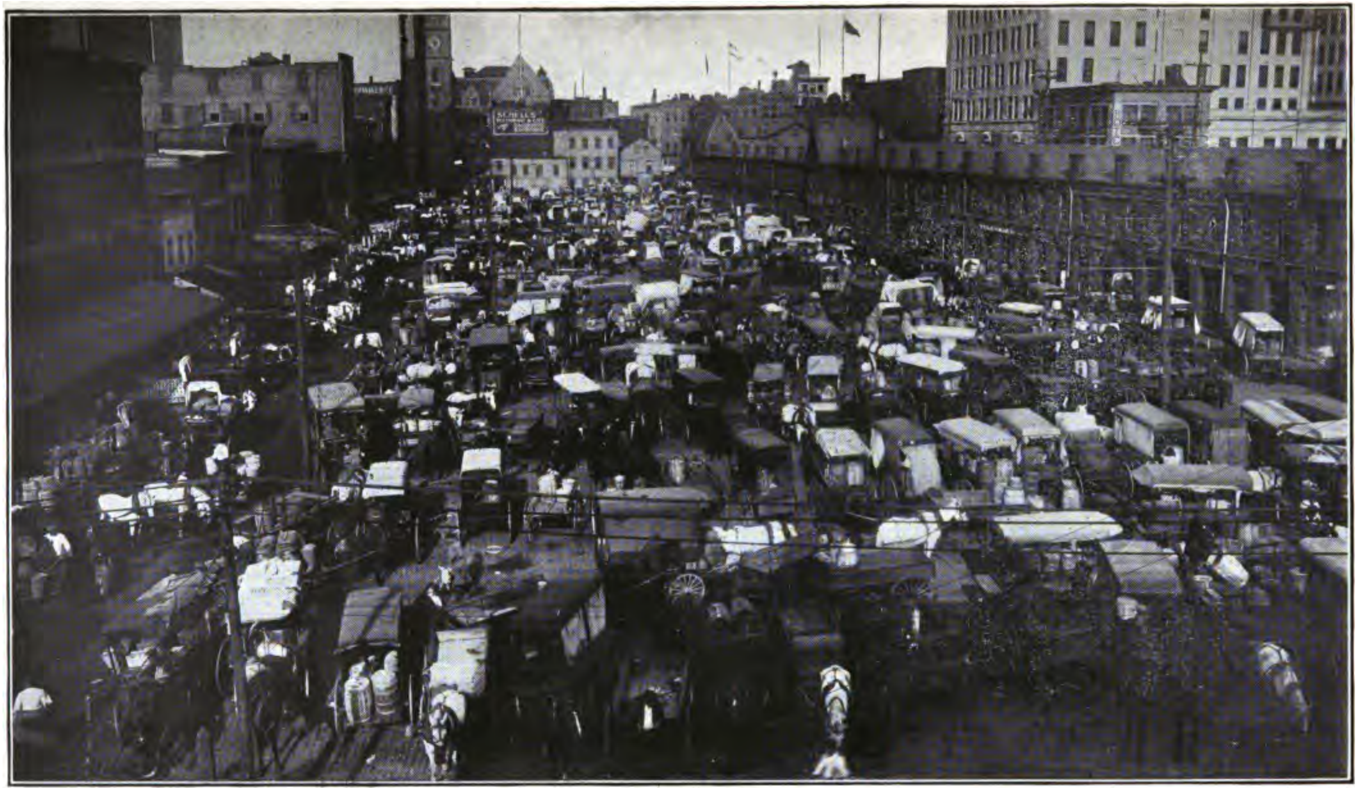
We have now in our state laws an "Act to incorporate associations not for pecuniary profits." Five or more persons may under this law form a coöperative association without capital stock and not for the purpose of making profits for its members. The Farmers' Coöperative Association of Mercer County is incorporated under this law. A descriptive circular published by them in the Spring of 1917 gives the following statement: "During the first year the association's sales were $123,770.05. The business cost for administration and general expenses were $3,818.82 and net profit $1,485.37. This business was done on a capital of about $300.00. Such an association must do business on a cash basis. This association returns all profits to the members of the association in proportion to the amount of business transacted.

PROBLEMS OF PARTICULAR INTEREST TO CONSUMERS

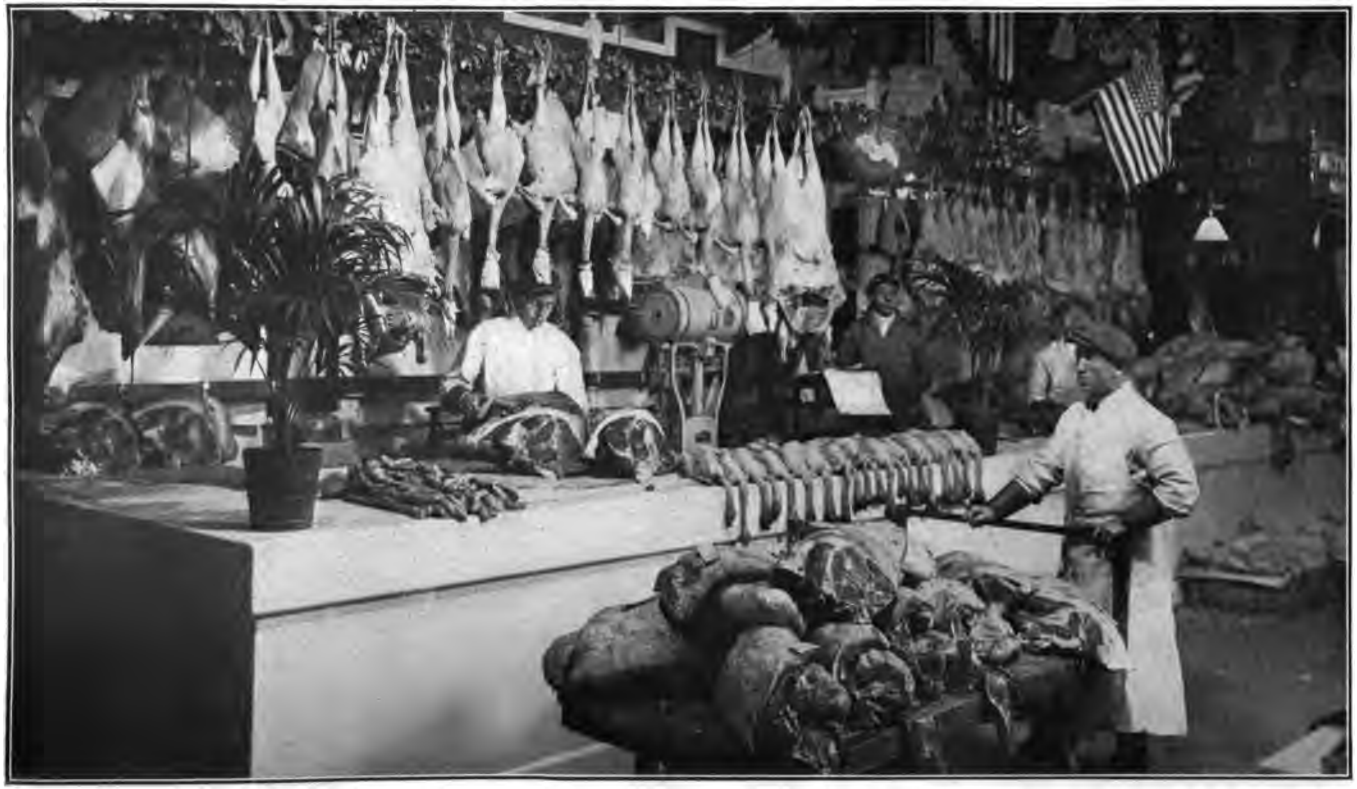
Salesmanship as it has developed in the United States follows goods from the point of production, to the ultimate individual buyer. Farm products are foods, and therefore especially interesting to everybody. To be sure, the modern housewife has no such intimate knowledge of crops, varieties and seasons as women of earlier times had. City conditions tend to emphasize the importance of many other things, and young women as they take their places at the heads of new households are severely handicapped in the economical purchasing and preparation of foods. The growth of women's organizations to study home problems, and the importance given to this general subject recently, are most encouraging signs. Only few instances have occurred where farm food products have been advertised by the growers, and a better understanding developed with consumers as to their value. Undoubtedly some of this work belongs to the state, but there must be a desire to learn on the part of housewives and consumers.

Direct Buying

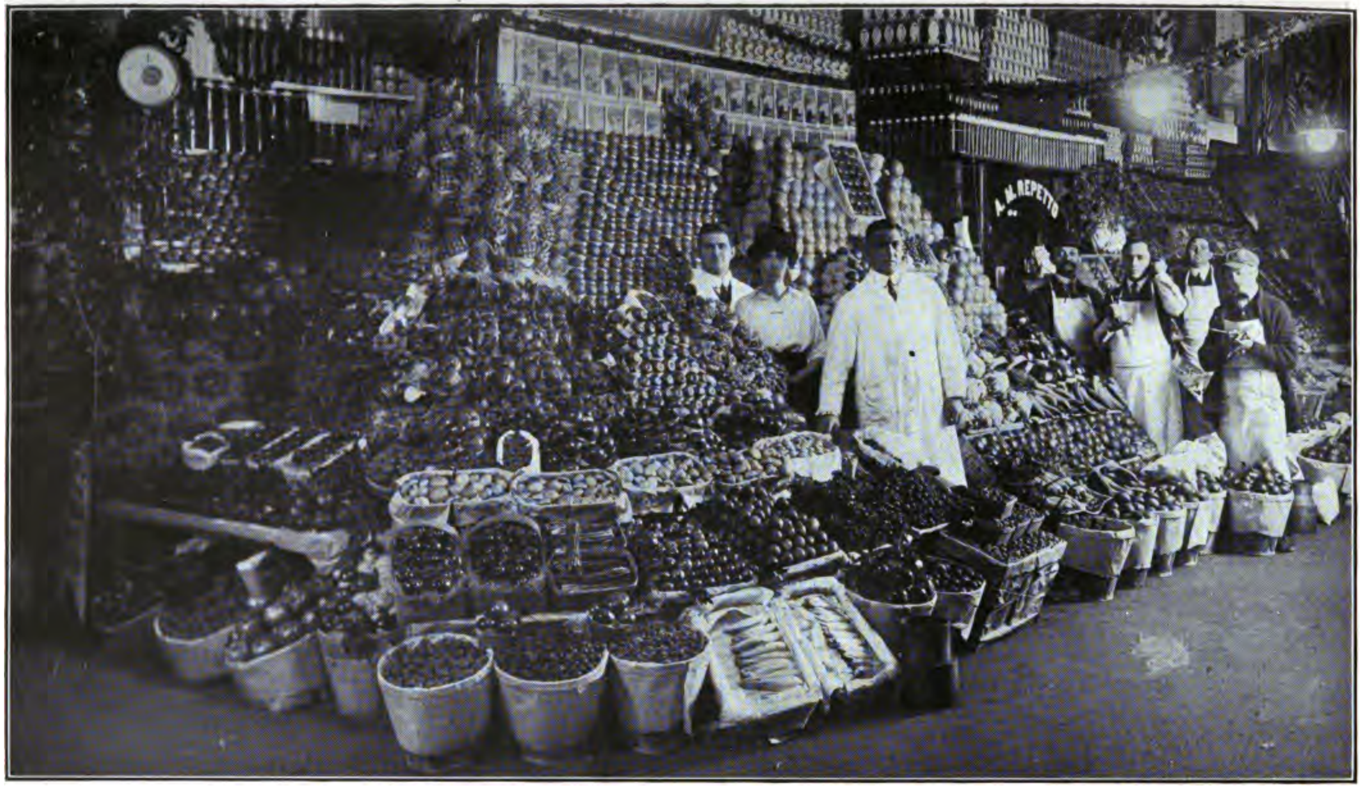
Direct dealings between housewife and farmer is the most efficient means of trade and the most satisfactory under certain conditions. In no other way can perishable products be secured in such a fresh palatable stage. As centers of population increase in size and farming lands are forced farther back, such means of distribution must necessarily give way gradually to less simple methods.



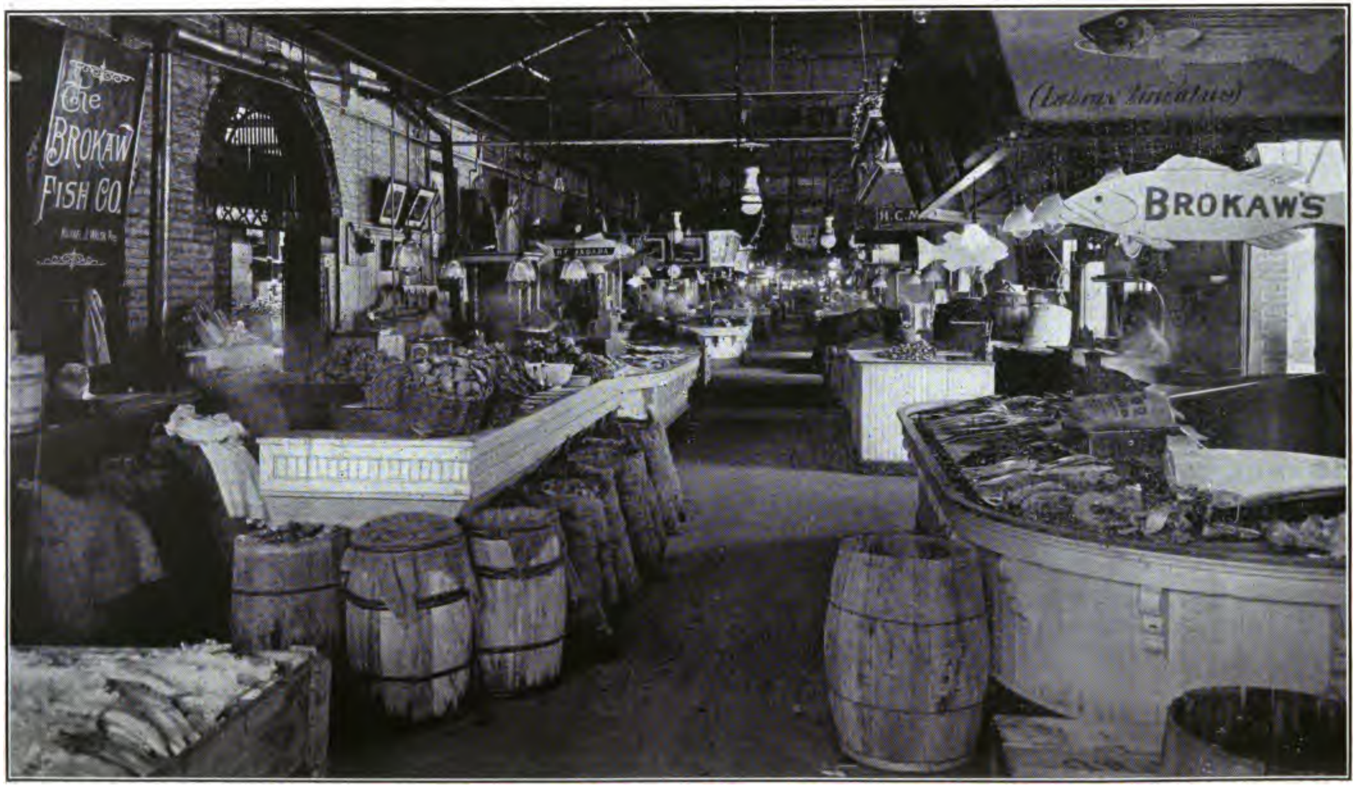
Farmers' Square, Center Market, Newark.



Butcher's Stand in Reading Terminal Market, Philadelphia.



A Fruiterer's Stand In Reading Terminal Market.



Fish Stalls, Center Market, Newark.

In all cities, however, closely surrounded by good farming territory, such a practice seems feasible. In all but very small villages and very large cities retail distribution can be perfected to the highest point by the establishment of public markets. These are old-fashioned institutions and are said to have been discarded by modern housewives because women of to-day do not have time to go to market. There is no question as to the efficiency of such markets, whether of the open-air kind or the more complete style, well housed and open for business the year round.

The question as to their practicability rests entirely on how much interested housewives are in saving. The percentage of saving possible to housewives seems to work out in general to be equal to the cost of delivery and credit which established stores are forced to add to their retail prices. The farmer under the same conditions saves the cost of rent and store upkeep, and receives enough above wholesale prices to compensate himself well for his own time.

Direct dealing can also be carried on by mail. The use of the parcel post system for foods has never developed to the extent hoped for, but many people buy certain commodities, such as butter, eggs, etc., in this way. Retail routes and peddling offer satisfactory means of direct dealing, and many farmers practice such methods.

Quantity Buying

There are numerous groups of people, especially in the large office buildings, who buy certain standard articles in quantity. In this way 50 to 200 pounds of butter are bought each week direct from a creamery. Although the custom of buying such things as potatoes in the fall has gone out of practice among women in general, a number of carloads are purchased each fall by women's organizations in the cities of New Jersey. Apples and oranges also are bought in quantities in this way.

During periods of market gluts, when farmers find it unprofitable to harvest certain products for ordinary wholesale prices, a group of housewives can, by ordering a large quantity, get excellent food for preserving at a minimum price, while the farmer finds a fair market.

Many such products of less perishable nature can be bought in quantity at a considerable saving. There is little excuse for any one to buy potatoes in less than bushel lots. It is to be regretted that house building in our New Jersey cities has now developed to the stage where hardly any place is available for food storing.

Caution as to Huckster Trade

The huckster trade which has grown to such large proportions in recent years offers an excellent way of distributing perishables. The hucksters do it quickly, and as they are under slight expense, can compete successfully for housewives' trade. The sanitary phase of the huckster trade is really appalling, and should be given thought by housewives and municipal authorities. The flies, pet cats, and stray dogs which abound around the homes of some of these hucksters offer excellent facilities for spreading disease. The proper storing of market food supplies at these places is just as important from a sanitary standpoint as the producing and handling of milk on the farm. No doubt this matter will receive more attention from our health authorities.

Delivery Costs

It should not be necessary to call attention to the high costs of retail delivery as practiced in our cities. The success of cash stores with no delivery connections is a most pleasing feature to students of economy. The subject of the housewives' responsibility in lowering the family costs of living is one that has had little real serious study, especially from a scientific standpoint. We urge the study of these matters by women's organizations and by individuals. A few suggestive topics are offered here.

Food values: protein, carbohydrates, fats, minerals, fruit and vegetable acids, etc.
Economy in cooking. Use of left-overs, etc.
Use of some neglected but useful foods: corn, entire wheat, etc.
Knowledge of crops. Varieties and seasons.
Personal selection. Insures economy and satisfaction.
Cash buying without delivery. Actual saving.
Quantity buying. Saving on certain things.
Public markets. Beneficial to all, and educational.

MUNICIPAL RESPONSIBILITIES

If the distribution of foodstuffs is of importance to the nation and state it must be equally important to the well-organized city government. Many cities have established certain ordinances aimed to regulate some phases of the business and to correct some abuses. Most of such rules have been designed to protect health. It would seem that with a city's hearty support the success of public markets should be assured. The public market is an institution of interest to municipal governments because it is an instrument primarily to promote thrift and to lower the cost of living. It is the most efficient method known for distributing perishable farm food products in cities. It is an educational agency the importance of which can hardly be overestimated.

Kinds of Public Markets

Many people disagree as to the practicability and value of public markets because they do not have in mind the same kind of an institution. Some people think of a market as a large open lot or street where farmers sell their products in small quantities only, direct to housewives and consumers. Others know of public markets only as large buildings where dealers rent booths and where housewives can buy any kind of foodstuffs from all parts of the world. There are other people who know of public markets only as places where farmers sell to dealers and where business is done only in wholesale quantities. These three types of public markets are common throughout the United States. In some cases a public market combines two or three of these methods of doing business. The housewife and those interested in the retailing of produce often think that the retail farmers' or dealers' market is the only one of real importance to the people of the city; on the other hand, farmers who grow large quantities and those who deal in farm products at wholesale, think that the wholesale market is the only kind that is practical. It is very necessary for one to understand the business of these various kinds of markets and what should be expected of them in order to realize their importance and know which kind to establish in any given community.

Establishment and Regulation of Public Markets

The factor of greatest importance in the successful establishment and operation of a public market is that of *cooperation* on the part of all concerned. It is a mistake for well-meaning persons in any city to open a public market place without considering the needs, desires and opinions of those who are expected to patronize it. For instance, the judgment and opinions of farmers are invaluable in the organization of a farmers' wholesale or retail market, and the dealers should by all means be considered in arranging for the establishment of a dealers' public market. The opinions and recommendations of various parties not only insure good judgment in establishing rules and regulations, but also tend to give the market strong support from those who should be most interested in it. It is well before establishing a market-place in a city or village to understand just what kind of a market will best suit the needs of the community. The market should then be located properly. If it is to be a wholesale market, it should be in the wholesale section of the city. If it is to be a retail market, an entirely different location may be necessary. Sometimes a dealers' retail market can be located where a farmers' open-air market would be entirely out of place. All of these points should be given due consideration. In providing rules for the regulation and operation of markets it has been found wise to invite the farmers and dealers to name a committee to coöperate with the municipal authorities.

Wholesale Markets

The object of the wholesale market is to relieve residential and other streets from the congestion which is apt to occur, and to concentrate the business in one place. In large cities it has often been found wise to provide suitable quarters for wholesale dealers adjoining or in connection with the wholesale farmers' market. The Wallabout market in Brooklyn is an excellent example of such an arrangement. In other places it may be well to locate the farmers' wholesale market in the section of the city where the wholesale dealers are already established. The Gansevoort market in New York and the farmers' market in Paterson, N. J., serve as examples of this plan. A wholesale public market should serve the interests of the farmers by giving them a place to come where they will be sure to find buyers. By concentrating the business and bringing all farmers together the buyers are given an opportunity of finding large quantities of various grades to select from. The farmers' wholesale market naturally develops into a community, as the community grows from village proportions into a city. The farmers congregate at a favorable spot and the city soon finds it necessary to furnish police protection and to enforce certain rules. It becomes then only a question of time when the city will find it necessary to provide a suitable place for a municipal wholesale farmers' market.

Such wholesale markets are invaluable to a city. Farmers are encouraged to bring their products to the city affording the best marketing facilities. This naturally results in more buyers coming in from nearby towns and all business interests of the city share in the benefits. Perishable goods are handled more quickly, and these goods get into the hands of the ultimate consumers in a fresher and better condition.

Retail Markets

Farmers' retail markets are not popular in New Jersey, or at least they are not common, and are thought by many to be impracticable. At Perth Amboy, N. J., is a market which utterly refutes the idea in many ways. In 1909 the city authorities set aside a street and an adjoining open lot as a market-place Farmers were encouraged to display their goods in small quantities and the people of the city gradually came to learn that they could do their marketing there at less cost than anywhere else. It is not unusual to find over one hundred farmers' wagons in the market-place at one time. Such markets as this are very common in many of the cities of Pennsylvania, and in other sections of the country. They offer certain very definite advantages to the thoughtful housewife. In the first place, she is able to buy her goods in the best possible condition, and by attending the market and personally selecting her goods she can pick out just the kind and quality she desires and be sure of getting full value for her money. By paying cash and carrying the goods home she saves the greater part of the extra charge which the retail distributors find necessary to add to the goods which they sell. She is provided with an opportunity for learning the kinds and qualities, seasons of ripening, and other various characteristics of the many kinds of fruits and vegetables of which most housewives know very little. The importance of a public market as an educational institution cannot be overemphasized. If the housewives of the nation spend two-thirds of the national income for food, how necessary it is that they should know as much as possible about the values and qualities of food products.

Financing

Perhaps no greater mistake can be made in starting a market than emphasizing the income to the city. The object of public markets is to systematize the distribution of foodstuffs for the purpose of effecting greater efficiency and economy. To plan the market as a source of income to the city government is directly contrary to its main objects. A market should support itself and perhaps pay a fair dividend on the investment. Some privately-owned market-places and some publicly-owned ones have proved most excellent financial investments. In every case where this is true their value to the community has necessarily been impaired. If farmers or dealers are made to pay for their stands and stalls they must ask a little more for their goods. In municipal-owned open-air markets 25 cents a day, or its equivalent if the stands are rented out for long periods, has usually been sufficient to cover all expenses and turn into the city treasury very good interest on the investment. Many evils have appeared in instances where stalls have been auctioned off to the highest bidder and where leases have been granted for more than a few months or a year. Where it is desirable for men to keep the same places year after year rules can be made to allow the present holder first opportunity for the succeeding year.

Suitable Market Types for New Jersey Cities

As already stated, informal market-places naturally develop in villages as they grow in population. In New Jersey these places are almost entirely wholesale in character. As the village grows into city proportions and the vacant lots become more scarce, certain streets are often adopted, and as most of this wholesale business is finished by 8 o'clock in the morning, the regular street traffic is interfered with but little. As such a market grows and the numbers increase, the noise and general confusion demands some control, and either privately-owned market-places are established or the city must meet the demand. The publicly-owned and regulated market is by far to be preferred. At about this stage in a city's development a more or less tangible demand is voiced for a retail farmers' market, and sometimes for an indoor market. Such demand seldom originates with farmers, and not often with dealers. More often it comes from progressive citizens and housewives and boarding-house keepers. Such retail markets present the most difficult problems. Our farmers have never had experience with them and the great bulk of our housewives are not prepared to patronize them. Dealers are skeptical of all innovations which are urged upon them. The logical way of bringing about the sort of conditions desired is by gradual development and practical education. The farmers' wholesale market is the first step. The agricultural organizations and institutions will usually be found willing to carry on a campaign of education for this work.

Some Well Established Markets

The Perth Amboy market has grown each year until in 1915 there were 6,299 loads of farm produce sold there. Farmers pay a fee of 25 cents a load, which in that year netted the city $1,575.75. It is estimated that the produce averaged the farmers about $30 a load, making a total of $188,970 worth of goods sold. About one-third of these products are sold at wholesale during the early morning hours. As many as 3,500 people have attended the market on "big days." If the $125,000 worth of food sold by these farmers direct to housewives is sold for 10 per cent less than dealers can afford to charge, the women have secured a saving of over $12,000. The satisfaction and information gained cannot even be estimated. It is noteworthy that it has been the foreign population which has supported this market most persistently.

In New Brunswick, after much agitation by "the Grange," the city established a market-place in 1915. From the day of opening, July first, until November first, receipts to the city were $806.50.

The Perth Amboy market is open three days a week and the New Brunswick market is open every week day. The former market is located in a section where working people live, the latter in the wholesale business section. The retail trade has never developed greatly in New Brunswick, but its benefit to the city has been great. The city has spent practically $10,000 on the market and is satisfied with it as a good financial investment alone.

Retail markets in large cities are not popular. The Washington market in New York and the Reading Terminal market in Philadelphia, however, are eminently successful examples of retail public markets. Doubtless the policy of the management has had much to do with the continued and increasing popularity. In most of the cities of eastern Pennsylvania retail farmers' markets are found. In some instances such markets are in modern sanitary buildings and afford every convenience for housewives to buy practically everything they need in the line of food supplies under one roof. Another style also is found where a common square or street is set apart for an open-air farmers' market. There are several of the inclosed kind in York, Pennsylvania, while in Easton is an example of the open-air plan.

The Need for Open-Air Farmers' Markets at the Present Time

The season of 1917 promises to present certain peculiar conditions. Staple food products will undoubtedly be scarce, while the extraordinary planting of small gardens insures a full supply of the more perishable summer vegetables. Fruit prospects also are good. Realizing the waste that may easily take place and the need of providing the freest possible exchanging and dealing in these perishables, temporary open market-places where producers and consumers can deal directly with each other should be seriously considered by every municipality.

Ordinarily, several years are necessary to establish a farmers' public market permanently. Housewives must get the habit of basket marketing, while farmers must reorganize their planting system and learn the art of retail selling. This season, however, should be one in which such market-places can be easily and quickly organized. The Bureau of Markets will readily consider individual, municipal problems, and offer suggestions, regulations, etc.

AUCTION SELLING

The distribution by means of the public auction sale of certain fruits and vegetables grown and consumed at home or imported from abroad has been in practice in England and other European countries for nearly one hundred years.

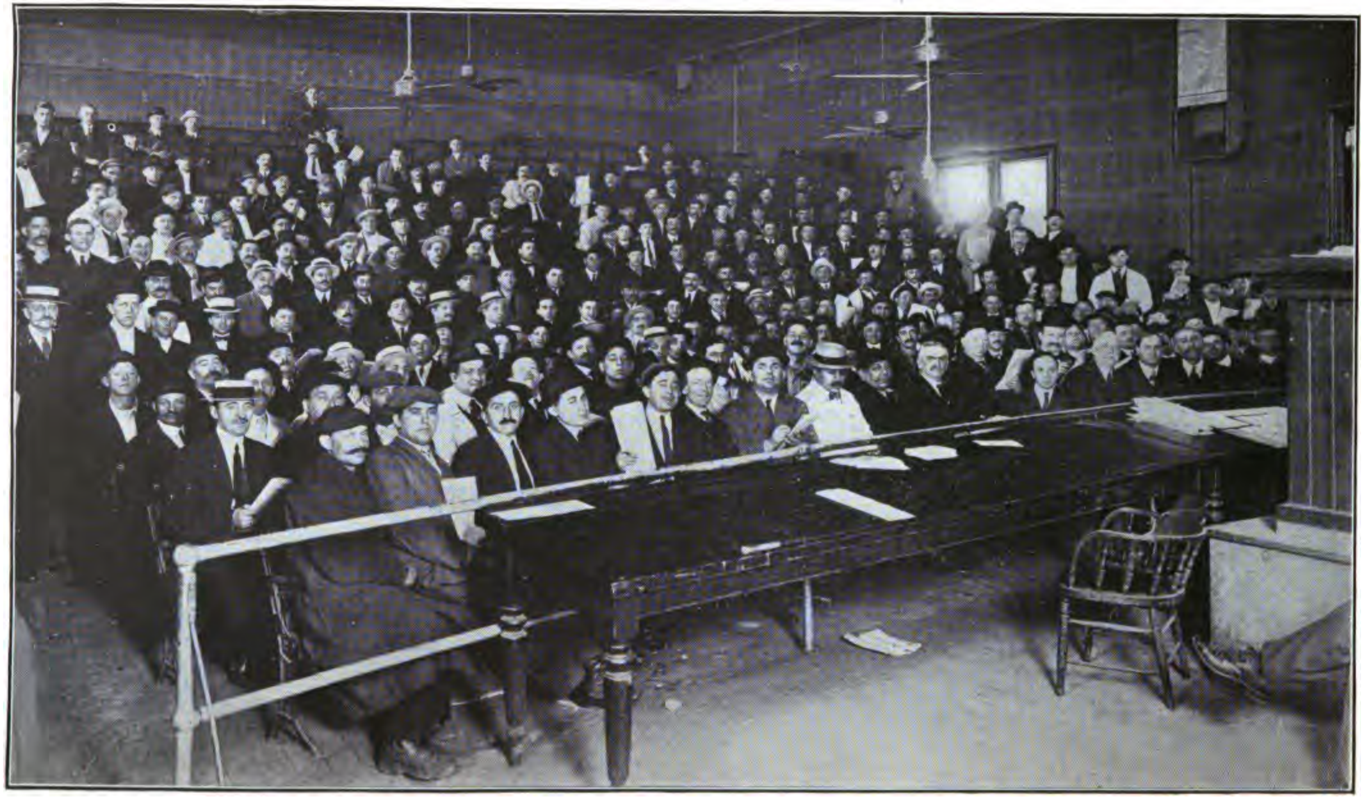
It is especially important in England, where the sales of apples alone for the year ending May 1, 1915, amounted to nearly 1,800,000 barrels and more than 1,000,000 boxes.

In the United States, auction selling of fruits has been practiced for about 70 years. It was first adopted as a method for the better distribution of imported fruits, and has been gradually extended until now a large part of the fruit produced in our own country finds its way to the retailer through the auction room. This method of selling has been adopted in the case of every fruit-growing industry in which it is in use for the purpose of overcoming the same difficulties and removing the same restraints of trade as when first adopted by importers of foreign products.

The principal advantages of the auction method over other methods of selling are: its economy, its publicity and its insurance to the seller, through competitive bidding, of the highest possible price for his offerings.

There are regular auction sales of fruits now held in fifteen American cities, and in one of them at least, the city of New

Samples of Southern Fruit Ready for Inspection of Buyers in an Auction Room in New York.



Buyers with Catalogues in Hand. Erie Pier Auction Room.

York, the auction method has been extended to include, besides foreign fruits, nuts and vegetables, all kinds of home-grown fruits.

The greater part of the business of the auction companies of New York is furnished by the fruit growers of California and other western states, but within the last two years some interesting experiments have been carried out by the Department of Foods and Markets of the State of New York in selling at auction in New York City shipments large and small of various kinds of fruits grown in the states of New York and New Jersey, and also in the holding of auction sales of apples in orchards at various points through the apple-growing sections of the state.

The results of these sales are of interest to fruit growers of New Jersey since the evils and difficulties of the private-sales system, which it was hoped the auction sale method would remedy, are common to shippers of both New York and New Jersey, and probably the same opposition would be encountered and the same difficulty in securing pier and salesroom accommodations would be met if steps were taken to inaugurate auction sales of certain products grown in New Jersey.

As to the actual results, in spite of the opposition and difficulty which usually attend the introduction of any innovation, canvasses by both the Department of Foods and Markets and the Fruit Auction Company show that a very large majority of those who sold through the auction were satisfied with the returns sent them and in favor of continuing the sales. If this be an indication of what results would be of an undertaking along the same line for the benefit of New Jersey fruit growers, or if individual growers or growers' associations in New Jersey care to avail themselves of such opportunities and facilities as are open to them now for testing the merits of the auction selling plan in the New York market, it would seem that as a most important preliminary the matter of providing for the adoption of standard packages and the proper methods of grading, packing and marketing should be given consideration.

CITIES MAY BUY AND SELL

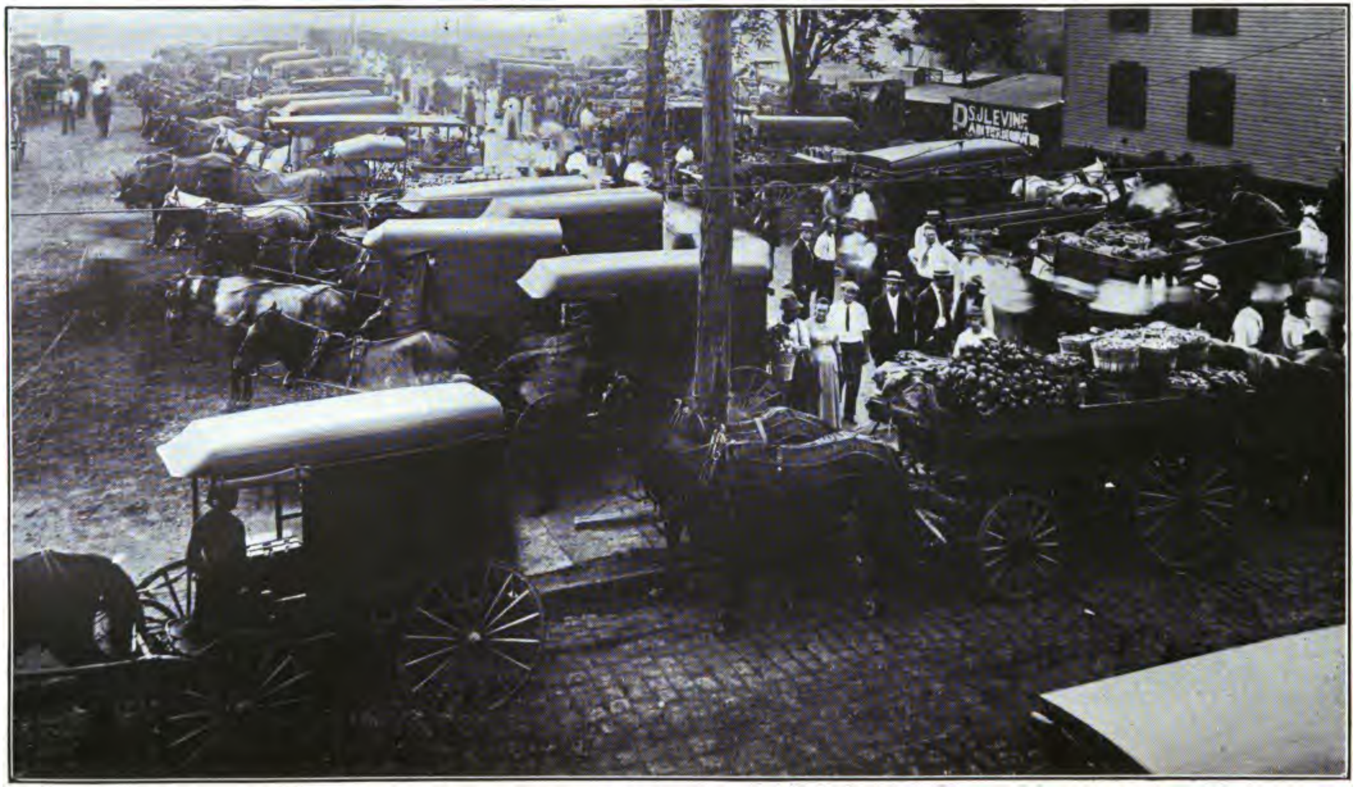
Appreciating some of the difficulties which were liable to occur in the present crisis, the Governor's Commission on the High Cost of Living presented the following bill to the State Legislature, which was passed by both houses and signed by the Governor, being known as Chapter 80 of the Laws of 1917 of the State of New Jersey.

State Supervision of Wholesale Trading

That the wholesale dealing in farm produce should have some state supervision is realized by many who have given it study. It has been stated that much of the so-called commission business in produce is carried on by selling the farmers' product for as much as possible and returning to the farmer as little as he would be satisfied with. While this may be true, it is apparent that any commission firm which hopes to remain in business must do for its shippers as well as or better than its competitors. The perishable nature of these goods often makes it very difficult to return the exact price received less commission. For instance, consider eggs. Egg candlers do nothing but work at their particular trade; and must be kept busy by their employer. Many cases of eggs from different shippers are candled by such workers and the various grades separated. If it were simply a matter of selling each crate as it came in returns could easily be made, but when a case after candling shows 22 dozen "hennery browns," 5½ dozen "hennery whites," ½ dozen "dirties," ¾ dozen "shrunken," ¼ dozen "spots," and 1 dozen "checks," and there are hundreds of sales made in a single day, something of the complex nature of the business can be realized. The perishable nature, of course, often makes it necessary to sell as quickly as possible, and is responsible for sudden deterioration in quality and value. It is a business in which unscrupulous persons can flourish and undoubtedly many deceitful and dishonest methods have been employed. While realizing all this, it is important that we acknowledge the necessity of commission men in our present marketing scheme and appreciate the great service they are engaged in. The unfortunate part of the whole thing is that the farmers, after all, are very much to blame for the evils which have sprung up. The very fact that such a condition can prevail in which these dealers can so completely dominate the situation is a disgrace to American farmers. When the commission system was first recognized as an efficient means of selling farm produce, the merchant was considered as the farmers' agent. The understanding was that he was to sell the farmers' goods and turn the receipts over to the farmer, taking out a certain commission for his services. If this excellent plan has been perverted, farmers must take the blame partly at least for allowing it. It is difficult to see how such a complex and delicate matter can ever adjust itself if left alone.

The State can maintain that this business is one of common interest and affects the welfare of all the people. It can insist

Eggs in Storage, Merchants' Refrigeration Company, Jersey City.



New Brunswick Farmers' Market, 1915.

that all who engage in it must register, deposit a bond and show their accounts. By registering they will place their names on file, the amount of money they have invested in their business and other important details. The State can then look up their record and designate the amount of bond which they must file so as to insure payments to prospective shippers. By access to their accounts the State can protect shippers against unfair treatment and the merchants from unjust criticism. The underlying principle is to protect and promote the interests of the honest shipper and the honest dealer. At the preesnt time if there are any dishonest commission men they offer most unfair competition to others in the same business.

A law was passed by the last Legislature at the request of the dairy interests of the State, and is known as Chapter 74, Laws of 1917, State of New Jersey. The first part of Section 1 is given below, setting forth the principal objects, etc., of the law. Copies of the full law can be secured in circular form upon application.

AN ACT providing for the licensing and bonding of all dealers in milk and cream who purchase from or contract with producers in this State or who receive milk or cream from such producers for shipment, sale or manufacture.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. On or after July first, nineteen hundred and seventeen, no person, firm, association or corporation shall engage in or carry on the business of buying milk or cream in this State for the purpose of shipping or for sale, resale or manufacture, unless such business be regularly transacted or conducted at an office or station within the State and unless such person, firm, association or corporation be duly licensed as provided hereinafter. Every such person, firm, association or corporation before engaging in the business of buying milk or cream for the purpose aforesaid, shall annually, on or before June first, file an application with the Secretary for Agriculture for a license to transact such business. The application shall state the nature of the business, as hereinabove set forth, the full name or names of the person or persons or corporation applying for the license, and, if the applicant be a firm or association, the full name of each member of such firm or association, the city, town or village and street number at which the business is to be conducted and such other facts as the Secretary for Agriculture shall prescribe. The applicant shall further satisfy the Secretary for Agriculture of his or its character, financial responsibility and good faith in seeking to engage in such business. The Secretary for Agriculture shall thereupon issue to such applicant on payment of ten dollars a license entitling the applicant to conduct the business of buying milk and cream from producers for the purpose aforesaid at an office or station at the place named

in the application until the first day of July next following; *provided, however,* that if application be made subsequent to July first in any year, said license shall run until the first of July next following. A license shall not be issued, however, to any applicant if, during the year preceding the application, a complaint from any producer and seller of milk and cream shall have been filed with the Secretary for Agriculture against such applicant for any grounds specified in section three hereof, and such complaint shall have been established as true and just to the satisfaction of the Secretary for Agriculture after such complaint shall have been investigated by the Secretary for Agriculture in the manner provided for in section two hereof. A license shall not be issued as provided in this section unless and until the applicant shall file with the Secretary for Agriculture as herein provided a good and sufficient surety bond by a surety company duly authorized to transact business in this State in a sum not less than one and one-half times the estimated maximum monthly indebtedness of the applicant to the parties or persons from whom he may purchase or receive or may have purchased or received milk or cream, or unless the applicant shall be relieved from such requirement as hereinafter provided. Such bond shall be approved as to its form and sufficiency by the Secretary for Agriculture.

COLD STORAGE FACTS

Perhaps nothing has done so much to conserve food supplies and prevent waste during periods of heavy production as has refrigeration. Great rooms with a capacity of 25,000 cases of eggs are now held with less than three degrees variation in temperature for months at a time. That through the use of cold storage goods may be held off the market, so that scarcity and high prices result, cannot be denied. In fact it is this tendency which has called forth so many regulatory laws of late years. Regulation by the State or Nation is necessary, but it must recognize the economic as well as the sanitation principles involved.

MARKET NEWS SERVICE

The possibilities in market news service are only beginning to be appreciated. During 1916 the Office of Markets of the United States Department of Agriculture issued daily advices concerning receipts, prices, etc., in large cities and from certain shipping points. This service met with immediate response. How much more the details of a similar service could be applied within a state is not known. It has been suggested that New Jersey create a market news service wherein growing, ripening and harvest conditions could be reported accurately and both shippers and buyers informed on the particular points most important to them.

EDUCATING THE CONSUMERS

The education of consumers is a subject which has never received the consideration it should from farmers. Housewives in our cities to-day are much farther removed from the sources of foods than were the women of fifty years ago. Then a good housewife had her favorite variety of apple for summer sauce making and another for fall pies, and still another to eat when sitting around the fire after supper. One variety of lettuce was favored for one purpose and another for a different use. This was true of all kinds of fruit and vegetables. During recent years Ben Davis apples and Golden Dwarf celery have been profitable to growers because they were easily grown, stood shipment well, and buyers "didn't know the difference." This condition also prevails in many of our common crops from potatoes to sweet corn and peaches.

Keen business foresight would have seen that continuous disappointment in apples would induce the average housewife to turn her attention to some other articles. It is interesting to note that the consumption of California oranges has increased 77 per cent during the past ten years. It might be a better business proposition to pay more attention to handling and selling high-quality, easily-bruised varieties than to growing tough, thick-skinned kinds.

The Bureau of Markets has given a few educational marketing exhibits on certain products and the interest manifested by housewives has been encouraging.

All the points mentioned in this bulletin, besides others of less importance and still other matters which are bound to arise from unforeseen causes, should have the attention of the State. Persistent effort accompanied and preceded by intelligent and thorough study will result in actual improvement and give greater satisfaction to all who are interested in the subject.

ORGANIZATION FOR THE IMPROVEMENT OF FARM AND CITY MARKETING

The Bureau of Markets of the New Jersey State Department of Agriculture was organized July 1, 1916. The emergency measures made necessary by the war to safeguard our own and our allies' food supplies have interfered with the carrying out of some of our plans. The subject of foodstuff distribution, as discussed in the bulletin, shows some of the work undertaken